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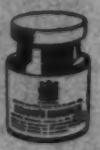

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY APRIL 5 1952

SOME RECENT ADVANCES IN ENDOCRINOLOGY*

BY

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Although recent advances largely depend on biochemical research and animal experiments, it would be a great mistake to ignore the importance of clinical observations and the interpretation of older clinical observations in the light of new knowledge. We have perhaps been rather dazzled by the influence of new hormones on the symptomatology of disease processes, and it might be argued by the pragmatic physician, or humanitarian, that successful therapy is the end-object of all medical research, but this conception certainly cannot replace the need for a deeper understanding of the causation of disease and its course. We must also not forget that Nature herself is a most prolific experimentalist, and if I may quote from my 1951 lecture at the New York Academy of Medicine: "Let us not be unduly obsessed by the laboratory so that our clinical senses and judgment become blurred, but, at the same time, let the clinician maintain a sensitive awareness of the experimentalist and biochemist, so that their penetrating shafts of revelation may not be shut out by obtuseness."

Growth Hormone—Its Multiple Manifestations

Thirty years ago Evans and Long produced giant rats by a saline suspension of pituitary glands of cattle. In 1939 Mirsky produced evidence that the nitrogen-retaining action of anterior pituitary extracts is mediated in part by the islets of Langerhans of the pancreas. Young (1941, 1951) and colleagues have studied the problem over a number of years from several angles. They observed that in rats (and also in young puppies) pituitary diabetogenic extracts did not produce diabetes but produced nitrogen retention, somatic growth, and an increased catabolism of fat, and histologically the pancreas of animals so treated showed hypertrophy of the islets of Langerhans accompanied by an increase in insulin content (Marks and Young, 1940). It was therefore concluded that the growth activity of a pituitary extract was closely related to its diabetogenic activity, and that the mechanism of "growth hormone activity" included the induction of hyperfunction of the pancreatic islets and hypersecretion of insulin.

In 1945 Li, Evans, and Simpson prepared from the anterior lobe of ox pituitary a purified protein having the biological characteristics of growth hormone. Its molecular weight was 44,250 and it contained tyrosine, tryptophan, and glutamic acid. The isolation of a crystalline growth hormone was announced by Fishman, Wilhelmi, and Russell (1947) and by Li, Evans, and Simpson (1948). In 1949 Cotes, Reid, and Young, using purified growth hormone in rats to measure growth-promoting activity and in cats for diabetogenic potency, formulated that the diabetogenic and growth-promoting activities are due to the same pituitary substance. The diabetogenic action of pure growth hormone was confirmed by Campbell, Davidson, Snair, and Lei (1950), who also contrasted it with the relatively slight diabetogenic action of adrenocorticotrophic hormone (A.C.T.H.).

Szego and White (1949) showed that a purified growth hormone preparation, in fasting intact and adrenalectomized mice, spared nitrogen metabolism and accelerated fat metabolism, as evidenced by intense fatty infiltration of the liver of the fasting animals.

Becks *et al.* (1944) have demonstrated an antagonism between A.C.T.H. and growth hormone; and A.C.T.H. alone will inhibit growth in normal or adrenalectomized animals. In the hypophysectomized rat, A.C.T.H. does not influence the inactive condition of the epiphysial cartilage, whereas growth hormone restores proliferative activity. This latter activity is prevented by the simultaneous injection of A.C.T.H. Growth hormone in the hypophysectomized rat caused an increase in protein of the carcass, whereas A.C.T.H. caused a decrease in protein and an increase in fat. The histological work was confirmed by Baker and Ingle (1948). Another interesting finding was that purified pituitary growth hormone has a marked galactopoietic activity (Cotes, Crichton, Folley, and Young, 1949).

Clinical Significance

What clinical significance have these observations? The occurrence of diabetes in the course of acromegaly is easier to understand, and also the fact that it is usually of greater severity than the diabetes of Cushing's syndrome. The finding of Coggeshall and Root (1940) that a substantial proportion of diabetic children are initially above average in height and physical development takes on added significance, as does the observation that mothers with large babies at birth are more prone to diabetes if they have not the condition already (Miller, Hurwitz, and Kuder, 1944). Acromegalics may be very large at birth. Cushing (1912) described the case of a Hungarian acromegalic who at birth was as large as a 1-year-old child and whose wife had three enormous babies, the middle one being the only survivor and weighing 17 lb. (7.7 kg.). This giant was in addition enormously fat for the first few years of life; this raises the question of hyperinsulinism resulting from the growth hormone, the question of fatness and growth in relation to the relative effectiveness of the catabolic action of growth hormone on fat and the contrasting anabolic action of the excessive insulin it has produced by stimulation of islet cells. There may, however, be a more prolonged association of adiposity with skeletal growth, since it has been found that a high percentage of fat children and adolescents are taller than their contemporaries.

The fact that the chemists found it very difficult initially to separate the pituitary growth hormone from the adrenotrophic hormone is not without clinical significance. Cushing

*Extracted from a paper given to the Harveian Society on October 11, 1951.

drew attention to the large size of the adrenal cortex, often nodular, in gigantism and acromegaly, but it is questionable whether pure growth hormone stimulates the adrenal cortex. Moon, Simpson, Li, and Evans (1950) found that long-continued injections of pure growth hormone in rats led to marked hyperplasia and neoplastic formation of the adrenal medulla, neoplastic nodules breaking through the cortex, but no evidence of stimulation of the adrenal cortex, although the surface was reported as nodular in 6 out of 15. Long-term experiments with A.C.T.H. should prove of interest. Incidentally, those authors noted other neoplastic stimulation by growth hormone—for example, lymphosarcomatous transformation in areas of peribronchial lymphoid hyperplasia (6 out of 15 rats), with invasion of bronchi, lung, and vascular channels, granulosa-cell tumours, and luteomas of the ovary.

Influence of Androgens on Skeletal Growth

Clinically, male acromegalics are hirsute, and hirsutism is a not infrequent complication of acromegaly in females. In one such patient under my care, a female acromegalic of 60 in whom the illness started at 30 and the hirsutism at 45, the urinary 17-ketosteroids were only 5 mg. and 3.4 mg. in two 24-hour specimens, but the adrenals at necropsy were twice the normal size and weight. In one mild acromegalic under my care, an adrenal adenoma, or adenocarcinoma, was removed at the age of 20, the symptoms being amenorrhoea and generalized hirsutism, and the 17-ketosteroids being very high—130 mg. in 24 hours. This was 12 years ago; menstruation has been regular but hirsutism persists, and the 17-ketosteroids remain at about 65 mg. Recent laparotomy showed no neoplasm. Is a pituitary androgenic stimulus to the adrenals responsible for hyperplasia of the left adrenal and neoplasm of the right? Lynch (1950) described a tall boy of 6 with pseudo-sexual precocity from the age of 3 who grew even more rapidly after the removal of an adrenal tumour than before. At 6 years he was 9 in. (22.8 cm.) above the average, and at 9, 13 in. (33 cm.) above the average. Mild androgenic symptoms also persisted. Was a pituitary stimulus responsible for the neoplasm and was that stimulus growth hormone alone or together with adrenotrophic hormone? These cases of adrenal sexual precocity also bring us to the question of how far androgens influence skeletal growth.

In contrast to the as yet inexplicable failure of growth hormone used therapeutically, testosterone or methyl testosterone is a powerful stimulus to skeletal growth in man, although its action may not be directly somatotrophic. It is effective in deficient growth associated with hypogonadism and in children in whom normal sexual maturity has not yet been reached. Its action is associated with nitrogen retention, increased appetite, and increased muscular development and strength. Its action on skeletal growth is certainly different in mechanism from that of pituitary growth hormone. Thus Albright (1947) found a raised serum phosphorus in active acromegaly; and this decreased with suppression of pituitary activity by radiation, surgery, or large doses of oestrogens or androgens. Kinsell, Michaels, Li, and Larsen (1948), of the California Medical School, have correlated these findings with the level of growth hormone in the patient's plasma and have divided physiological growth in man into two phases: (1) childhood pituitary type with high plasma phosphorus, and (2) adolescent steroid type, with normal plasma phosphorus and dependent upon adrenal and gonadal androgens, to which might be added progesterone, which is experimentally effective. Androgens and oestrogens also accelerate bone age and epiphysial union in heavy dosage, but I have not found this an obstacle to androgen therapy for retarded growth.

Adiposity

Last year a distinguished visitor from the U.S.A. crystallized his support for the gluttony theory of adiposity in the telling phrase: "Fat comes from food—where the hell else could it come from?" As a fundamental qualification of this I would cite the clinical history of an infant of 6 months who suddenly develops a voracious insatiable appetite and monstrous obesity, and at the age of 12 months dies from heart failure, a large adrenal cortex adenocarcinoma being found.

The whole of the aetiology of the adiposity battle has been fought along quantitative mathematical lines, but more recently qualitative considerations have been prominent. Kendall's paper on the subject appeared as long ago as 1945, but it has been much neglected. He studied the action of various adrenal steroids implanted in mice, observed for some six weeks. Compound A (11-dehydrocorticosterone) produced an increase in weight compared with the control mice, and compound B (corticosterone) produced a decrease in weight, but in both animals analysis of the carcass showed a great increase in the percentage of fat and a decrease in the percentage of protein. Compound E (cortisone) showed less significant changes. Thus an exogenous adrenal hormone, which might well be endogenously secreted in certain conditions, could exchange much of the protein of the body for fat with or without an increase in weight. Kendall (1945) suggests that the glucose derived from protein breakdown is converted into fat in the presence of these adrenal compounds, but is oxidized in their absence. It is of interest that degenerative lesions, sometimes complete necrosis, were found in the muscles. Hog's adrenals were examined for compound A, but were found to contain large quantities of compound F (17-hydroxycorticosterone). These results might have been anticipated in some degree by the earlier experiments on adrenalectomy in rats which showed a relative loss of fat compared with control paired-fed normal rats (Simpson, Dennison, and Korenchevsky, 1934).

The fact that body weight can be increased without an increase in diet by the action of hormones has also been demonstrated recently by Young (1951). Thus dogs receiving growth hormone alone, or together with insulin, increased their weight on a diet which was primarily only sufficient for them to maintain it. This apparent contradiction of the laws of energy was explained by the fact that protein was deposited and fat burnt, and the combustion of fat gives much more energy than that of protein. Under other circumstances, and with increased food intake, both fat and protein were deposited. The increased appetite following administration of growth hormone or testosterone usually results in an increased proportion of body protein rather than fat, and this contrasts with the action of A.C.T.H. or of adrenal compound A.

The part played by endogenous insulin in adiposity may be reflected in the fact that an islet-cell carcinoma is probably the only carcinoma (apart from some adrenal cortex tumours) in which the presence of metastases is manifested by increased weight and fat. It is a challenging qualification of hormone theories that hypothalamic lesion adiposity occurs even after hypophysectomy. It will be of interest to see if it can also be induced after bilateral adrenalectomy. Can the hypothalamus influence the metabolism and deposition of fat apart from inducing polyphagia?

It is often argued that these endocrine adiposities have no relationship to the main problem of idiopathic adiposity, but this argument becomes rather tenuous when the widespread incidence of endocrine stigmata is recognized, and from the fact that endocrinopathies may have very long life histories. I was recently asked to see a patient of Mr. Leslie Williams's at St. Mary's Hospital, a woman of 35, who weighed 112 lb. (50.8 kg.) before her first pregnancy, 224 lb. (101.6 kg.) after it, and returned to her normal 112 lb. (50.8 kg.) within a year. In the second pregnancy her weight increased from 117 to 238 lb. (53 to 108 kg.) and then again became normal, and in the third pregnancy from 133 to 228 lb. (60.3 to 103.4 kg.) followed by a return to near normal. Surely this is the effect of pregnancy pituitary-adrenal hyperfunction and subsequent involution, an involution which is far less complete in many women. In one such persistent adipose case the glycogen steroids six months after pregnancy were some three times the normal (Simpson and Bornstein, 1951, unpublished observations).

The pituitary adrenal hyperfunction syndrome of adipose gynism that I have recently described (Simpson, 1951a) probably has its counterpart in adult life, as, for example, manifested by the fat mother of such a patient with plethora, mild facial hirsutism, hypertension, and wide areas of reddish cyanotic discoloration on the upper arms, thighs, and inner knees. It is relevant to my thesis of the endocrine origin of adiposity that Robinson and Norton (1951), in a series of cases, found "undoubtedly high excretions" of corticosteroids only in Cushing's syndrome and in those cases "in which there was very marked obesity not necessarily associated with pituitary dysfunction."

Diabetes Mellitus

The classical experiments of Mering and Minkowski (1890) and the discovery of insulin by Banting, Best, and Macleod (1922) appeared to leave the pancreatic islet deficiency origin of ordinary diabetes mellitus in no doubt. However, for many years it has been recognized that acromegaly and Cushing's syndrome may be associated with diabetes mellitus and that the severity of the diabetes waxed and waned with that of the primary endocrinopathy. Young (1941) showed that pituitary extracts could produce permanent diabetes by secondary destruction of the islets of Langerhans. Wilder (1950) quite recently maintained the unitary conception of diabetes mellitus as a deficiency disease of the islets of Langerhans. Two questions arise from these considerations. Could diabetes mellitus exist without an islet-cell lesion, and is pituitary and (or) adrenal hyperfunction a cause of diabetes mellitus in the absence of a major endocrine disorder —the diabetogenic action of pituitary (Young, 1941) and adrenal (Ingle, 1944; Ingle, Sheppard, Evans, and Kuizenga, 1945) hormones having been demonstrated experimentally? Against this background was the clinical differentiation of diabetes into young thin and middle-aged fat types (Falta, 1936) and their rough correspondence into insulin-sensitive and relatively insulin-insensitive (Himsworth, 1936, 1949).

The first blow for the adrenal glands was struck by Sprague, Priestley, and Dockerty (1943). A woman of 49, diabetic for three years, having received as much as 145 units of insulin daily but then 30 to 68 units, with blood sugar 252 mg., no ketone bodies, never hypoglycaemia, and no endocrine stigmata, was found to have a mass in the right upper abdomen. An adenocarcinoma of the right adrenal gland was removed and the diabetes completely disappeared, without relapse during the eight years' subsequent observation. Balfour and Sprague (1949) described another case, that of a boy of 15 who first presented with diabetes and soon developed Cushing's syndrome, in whom large quantities of compound F were found in the urine; necropsy, at death after adrenalectomy, showed enormous hypertrophy of both adrenals. The characteristics of these adrenal diabetics are, as in rats, relative insensitivity to insulin, rapid response to fasting even without insulin, and negative nitrogen balance. In 1948 I described adrenal diabetes in a man of 48 who was very hairy and strong from the age of 9, and developed diabetes at the age of 46. Lister, Nash, and Ledingham (1951) described adipose diabetes with features of Cushing's syndrome in many patients in an ordinary diabetic clinic.

But the deciding division has been made by Bornstein and Lawrence (1951) in their brilliant experimental paper, "Two Types of Diabetes Mellitus, With and Without Available Plasma Insulin." They used alloxan-diabetic hypophysectomized and adrenalectomized rats and measured the blood sugar one hour after the injection of 1 ml. of plasma from their patients. The method was sensitive to 1/2.000 of a unit of insulin or less. They do not as yet conclude that the patients with normal insulin content of the blood must have hyperactive pituitary or adrenal glands, although such seems probable, if not certain; nor have they as yet followed up this type of case to show that at a later phase the insulin disappears from the plasma if and when the islets become destroyed by a persistent hyperglycaemia. I am quite certain that in a large proportion of middle-aged fat diabetics the diabetes is of pituitary-adrenal origin, as in the case of a woman I saw who was very fat at 14 and again at 43, who developed diabetes at 52, and who died at 60 with a basophil-chromophobe adenoma of the pituitary, hyperplastic adrenals, some pancreatic islets hypertrophied, and others hyalinized.

The secretion of an excess of adrenal corticosteroids in diabetic acidosis was first ascribed to a pituitary-adrenal response to shock or infection, precipitating the diabetic coma and the secretion of corticosteroids, but it also occurs if incipient coma is produced by withdrawal of insulin in young diabetics, and its significance is not clear (McArthur, Sprague, and Mason, 1950).

Houssay (1951) recently reported in London that the incidence of diabetes induced by partial pancreatectomy is greater in male rats than female rats, and that ovarian hormones have a protective action. This is not obviously applicable to man, but it is unexpected and interesting.

Cortisone and A.C.T.H.

It is interesting to reflect that cortisone (compound E) or 11-dehydro-17-hydroxycorticosterone was isolated and correctly formularized more than a decade ago, but its dramatic therapeutic application is of only three years' standing. It has since been hailed as the "miracle drug," although a cold douche has been thrown on this conception by Professor Russell Cecil (1951), of Cornell University, who referred to it as "a glorified aspirin" and, bracketing it with A.C.T.H., said, "Hench and Kendall have only given us two more drugs to fumble with." The truth is somewhere between these two views. The term "glorified aspirin" is more apposite than its user envisaged, since salicylates (as some other drugs—for example, morphine, nicotine, colchicum, histamine, and adrenaline) can produce secretion of cortisone from the adrenals, via the release of pituitary A.C.T.H. In animals, salicylates produce a fall in the content of adrenal ascorbic acid and cholesterol and in blood eosinophils (Van Cauwenberge, 1951); but salicylates, in contrast with cortisone, lessen the glycosuria of partially depancreatized rats and increase clotting-time. Apart from this, salicylates, while effective in rheumatic fever, are ineffective in rheumatoid arthritis or, at least, never approach the dramatic relief of cortisone.

A.C.T.H. is a pituitary hormone which stimulates the adrenals to secrete cortisone and also adrenal androgens. To some extent androgens counteract cortisone—for example, in producing nitrogen retention as opposed to nitrogen loss. This is a theoretical advantage in some circumstances. A.C.T.H. is more likely to produce acne and hirsutism for the same reason, but these effects also occur with cortisone, which in large doses appears to be partly converted to an androgenic substance. Cortisone produces atrophy of the adrenals and a temporary lack of response of the adrenals to A.C.T.H. It also produces atrophy of the gonads, which is less easy to understand. A.C.T.H. produces hyperplasia of the adrenals. In clinical therapeutics, the actions of A.C.T.H. and cortisone are similar, but some differences have emerged, not always with a rational explanation.

Long-term Results

I cannot attempt to review the wide and important field of work already achieved with cortisone and A.C.T.H., but will try to touch on certain aspects. Although Boland (1951) has reported satisfactory long-term results with mild or moderate cases of rheumatoid arthritis, I do not believe that you can completely suppress the disturbing manifestations of the more severe types of rheumatoid arthritis over a long period without employing doses of cortisone which will, in time, produce the not unexpected adverse hormone effects of cortisone. Nor do I believe that this dilemma is solved by the alternate use of A.C.T.H. On my visit to the U.S.A. last year I formed the impression that this problem was troubling workers in this field, and they certainly were experimenting with all kinds of interrupted and alternating courses and gradations of dosage downwards

and upwards, but the problem may be intrinsically insoluble. If cortisone is used with the sole object of completely suppressing symptoms regardless of dosage, one is apt to produce a tendency towards Cushing's syndrome, and I have seen such an induced case, including osteoporosis and spontaneous compression fracture of the spine. Nevertheless, in our present state of knowledge, I agree with the view that cortisone is an invaluable therapeutic agent in rheumatoid arthritis.

The fact that cortisone minimizes the distressing reactions of the body to disease without abolishing the disease itself is not necessarily an objection to its use, and it may be very welcome in this direction. Surely one important principle of conservative therapeutics, in the absence of more specific therapy, is to tide the patient over an illness, to make him comfortable, conserve his strength, and let Nature help him where and when she can. In some conditions, however, cortisone may be hindering Nature, and perforation of corneal ulcer and of gastro-duodenal ulcer, the spread and hiding of peritonitis, and the extension of localized tuberculosis are possible and actual complications of cortisone therapy, caused by its inhibition of the local reaction of the tissues to disease processes. Of this we must be aware. Nevertheless the study of the pioneer work of Selye, of Montreal, on the alarm and adaptation syndrome, and clinical indications, show that the body does react to infection, shock, and sensitization by pituitary-adrenal hyperfunction, and the release of A.C.T.H. and cortisone. In some circumstances the adrenals (or the pituitary) may become exhausted (Selye, 1946) and need to be supplemented. We must study these problems very carefully and try to form clinical and laboratory criteria for sound judgment. The subject is difficult, and sometimes results are almost irrational because of incomplete knowledge.

Adams, Berglund, Balkin, and Chisholm (1951) reported dramatic results in three children with severe general burns. For example, a girl of 7 remained febrile for four weeks, was irritable, and refused to take food. She received numerous transfusions and saline; then A.C.T.H. was given in 20-mg. doses daily, but divided up. After two days her temperature dropped, she gladly took food, and rapidly got well. A boy of 4, very ill, disorientated, and restless, responded in the same way. Contrary to expectations, there was no interference with normal healing or with skin grafts; others even claim benefit in these directions. Sevitt, of Birmingham (1951), found that in the majority of fatal cases of burns the patients die with eosinopenia and histologically active adrenal glands. The symptoms of a disease may appear worse than the disease process, and Reeder and Mackey (1950) have reported rapid subjective improvement and drop in temperature following cortisone in pneumococcal pneumonia, although animal experiments indicate the danger of bacteriaemia resulting. Suzman and Rudolph (1951) reported a life-saving effect of cortisone in very acute dermatomyositis, although the response is not always of this beneficial character.

Effects on Allergic States

I am particularly intrigued about the effects of cortisone and A.C.T.H. on allergic response, and I believe that in this field will be found their greatest usefulness, not only therapeutically but in bringing into prominence again older theories on the allergic symptomatology of many disease processes, whatever might be the initiating morbid process. Long and Favour (1950) have shown that cortisone diminishes periarteritis and endocarditis that have been produced by injections of horse serum, and that cortisone diminishes tuberculin-sensitive reactions in man. It has been observed (A. R. Rich, quoted by Howard *et al.*, 1950) that anatomic lesions in drug hypersensitivity and horse-serum-induced periarteritis bear a close resemblance to those of rheumatic fever. Cortisone and A.C.T.H. may produce dramatic benefit in skin hypersensitivity due to drugs, giant urticaria, angioneurotic oedema, and exfoliative dermatitis and bullous erythema—for example, following penicillin or atropine. These effects on allergic states are obtained even when antihistamine drugs are ineffective and cortisone does not affect the reaction to injected histamine or acute anaphylaxis, which is prevented by antihistamine drugs. Cortisone does not usually affect antibodies, but large doses over a long period cause a diminution of new formation of antibodies.

Howard, Harvey, Carey, and Winkenwerder (1950) found A.C.T.H. very valuable in chronic, severe, intractable asthma, and complete remission often followed for some weeks or months after injections ceased; and A.C.T.H. proved superior to cortisone. Nattrass and Latner (1951) found A.C.T.H. very beneficial in 13 cases of status asthmaticus. Cortisone, as drops or injected subconjunctivally in very small doses, is proving of great value in a number of eye conditions, including ophthalmic hypersensitivity reactions. The results in periarteritis nodosa and acute disseminated lupus erythematosus are good but variable, and relapses occur. In children, I have seen very good results from A.C.T.H. and cortisone in intractable oedema of lipoid nephrosis, but results are not constant, and spontaneous remissions are met with in this condition. A.C.T.H. appeared to be superior to cortisone.

The experimental work of Long, Miles, and Perry (1951) on the effect of A.C.T.H. or cortisone in decreasing local sensitivity to tuberculin injections seems fundamental. Cortisone (or A.C.T.H.) appears to act not directly on this sensitivity reaction but by inhibiting the action of glutathione, or similar –SH substance, in cabbage, which itself prevents the oxidation of ascorbic acid. Ascorbic acid can then be oxidized into dehydroascorbic aid, which is the desensitizing agent. Dehydroascorbic acid is chemically related to alloxan, and both are diabetogenic.

It seems to me that, apart from endocrine disease, A.C.T.H. and cortisone will have their assured application in selected acute conditions or acute phases of more chronic disease, and more especially in allergy and locally in ophthalmic disease, but that their long-continued use in full dosage will often lead to endocrine pathology and psychopathic states.

Methyl Androstenediol

Perhaps one of the most potentially useful therapeutic substances recently available is methyl androstenediol, in 10-mg. tablets, although it was synthesized by Ruzicka as long ago as 1935. It is a steroid structurally related to methyl testosterone but only mildly androgenic by mouth. Its chief action is protein anabolic, and it is being explored with favourable results in a wide field formerly covered by methyl testosterone, including osteoporosis, reversal of negative nitrogen balance, mastitis, menopause, dysmenorrhoea, metrorrhagia, and some neoplasms. It is without the disturbing androgenic effects of testosterone or methyl testosterone—for example, acne, hirsutism, and deepening of the voice (Hall, 1951).

Primary and Secondary Adrenal Insufficiency

Cortisone by mouth can be used with advantage as supplementary therapy in both Addison's disease and Simmonds's disease; A.C.T.H. is theoretically preferable in the latter but of little or no use in the former, as the diseased adrenal cannot respond. Although deoxycortone therapy is theoretically incomplete treatment for Addison's disease, a large proportion of patients do well enough with it. Others may fail to gain weight and strength even with methyl testosterone added, and may also tend to have hypoglycaemic phases. These patients will benefit from the addition of cortisone, 12.5 to 25 mg. by mouth daily, and some may become fat. Since larger doses of cortisone in non-endocrine diseases are known to cause a dissemination of a localized tuberculous process, even when the latter has not been clinically evident, it might be thought dangerous to give cortisone to a patient known, or believed, to have tuberculous adrenals, with or without other obvious tuberculous lesions, and it would seem advisable to limit the dose to the minimum necessary for adequate well-being. However, Thorne *et al.* (1951)

advise that, in crises, 50 to 100 mg. of cortisone should be injected six-hourly, apart from other measures, and no harm has resulted from such short intensive therapy. It is also relevant that adrenalectomized animals and Addisonian patients, both lacking endogenous cortisone, are more liable to intercurrent infection than normal controls.

In Simmonds's disease, methyl testosterone has in my experience proved an invaluable treatment, supplemented by the cautious addition of thyroid; and a small proportion of patients also require deoxycortone. Nevertheless additional cortisone by mouth is often necessary to achieve optimum vigour, libido, and mental well-being. Quite small doses—for example, 12 mg. daily—may prove effective. However, Summers and Sheehan (1951) found depression, moodiness, and obstinacy after initial elation, and Robertson and Kirkpatrick (1951) found cortisone alone of doubtful value in one case although A.C.T.H. was of considerable value. Thorn *et al.* (1951) injected 10 mg. of A.C.T.H. every 12 hours and maintained patients in excellent condition, but in two of Summers and Sheehan's cases migraine and hemiparesis developed. In practice, the addition of cortisone by mouth to the usual regimen, where necessary, seems the best procedure, particularly when the tendency to hypoglycaemia is troublesome. Cortisone by itself is incomplete replacement therapy.

Endocrine Hyperfunction

I would like to draw attention to the problem of endocrine hyperfunction and the limitations of therapy in the absence of a causative neoplasm. It is one of the greatest problems in endocrinology, especially in relation to pituitary-adrenal hyperplasia.

Thyroid hyperplasia was overcome by surgery, made safer by preoperative methyl thiouracil, or by methyl thiouracil itself in some cases, and more recently by radioactive iodine, which I believe, from my American experience, will prove to be the best treatment. It leaves untouched the problem of exophthalmos, which can be produced experimentally by pituitary thyrotrophic hormone in the presence or absence of the thyroid gland. Pituitary-gonadal sexual precocity is very difficult to influence, and subtotal resection of hyperplastic ovaries can be repeated several times, with early regeneration following. Subtotal pancreatectomy for hypoglycaemia may be followed by relapse even when repeated, although we cannot assume with certainty a pituitary-pancreatotrophic stimulus.

Unilateral adrenalectomy for the adrenogenital syndrome or for Cushing's syndrome is rarely of appreciable permanent value, and can be compared with hemithyroidectomy. Pituitary irradiation in Cushing's syndrome is very inconstant in its effects, and adrenal irradiation has not proved promising. Radon seeds in the pituitary gland itself may sometimes prove superior to pituitary irradiation. Surgical hypophysectomy in the absence of neoplasm has not been given a trial, and it may be that it should be tried in spite of its radical major character. We badly need radio-isotopes that would be selectively taken up by the pituitary or the adrenals, as is radio-iodine by the thyroid; and further metabolic research in this field is required, although it may prove fruitless. Attempts to inhibit the pituitary by androgens or oestrogens or cortisone or thyroxine are faced with the difficulty of the noxious unwanted systemic effects of large doses of the hormones necessary. Some French workers have recently synthesized a substance whose oestrogenic potency is weak compared with its pituitary-inhibiting capacity, and this is in the right direction. We know that androgens and glucocorticoids can inhibit the secretion of A.C.T.H. and have a reciprocal effect, so that androgens can inhibit the secretion of adrenal glucocorticoids, and vice versa. This is very important, and its therapeutic implications have not yet been fully explored. Initial observations have not indicated radical therapeutic achievements, but much is yet to be done.

Recently, at the Mayo Clinic, I saw examples of good results from bilateral subtotal adrenalectomy in Cushing's syndrome. A paper by Priestley, Sprague, Walters, and Salassa (1951) has been published and Waltman Walters gave the Moynihan Lecture on this subject at Leeds last year. Of 29 patients, six died before use of cortisone in the pre- and post-operative phases and none have died since. Of the 23 surviving patients, 3 have adrenal insufficiency, 19 have good clinical results, and 3 are still being observed. However, no one will doubt the major character of this procedure surgically or physiologically, and no one would wish to accept this as more than an interim answer to the problem.

The problem of hirsutism is one of especial difficulty and one which causes great distress. Normal or low 17-ketosteroids do not indicate an absence of excessive androgenic stimulus, nor even do adrenals of normal size and weight. Yet some cases in women must be ascribed to a genetic distribution and strength of hair follicles. In others the only detectable abnormality is a limited adrenal androgenic excessive stimulus. This is not necessarily due to an excessive pituitary A.C.T.H. stimulus of androgenic character, since a study of pseudo-hermaphrodites with adrenal hyperplasia shows that the adrenal androgenic cells are genetically in excess to the extent of filling the adrenal glands and causing adrenal glucocorticoid and metabolic insufficiency, and, further, they may replace the germinal tissue in the gonads. It is therefore of considerable interest and potential therapeutic application that Baker and Whitaker (1948) have shown that the local application of cortisone to the skin of the rat causes thinning of the epidermis and failure of the hair follicles to develop; and Baker, Ingle, Li, and Evans (1948) obtained similar results with injections of A.C.T.H. I hope to report on clinical trials in selected cases at a later date, but the difficulty of long-continued therapy with potent hormones is not negligible.

Summary

Experimental and biochemical research in endocrinology has thrown much light on clinical problems, but the clinician must not be overawed or fail to contribute his potentially invaluable observations and judgment. Work with pure growth hormone has shown its influence in wide clinical fields—namely, augmented weight, adiposity, diabetes mellitus, and lactation. The value, dangers, and limitations of cortisone and A.C.T.H. in endocrine and non-endocrine disease are being clarified by experience. The problem of endocrine hyperfunction remains a serious challenge to endocrine therapeutics.

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DARAPRIM IN TREATMENT OF MALARIA

A STUDY OF ITS EFFECTS IN FALCIPARUM AND QUARTAN INFECTIONS IN WEST AFRICA

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During 1949–50 a large series of substituted 2 : 4-diaminopyrimidines was synthesized by Falco *et al.* (1951) and tested against laboratory infections of *Plasmodium gallinaceum* in chicks, of *P. berghei* in mice, and, in certain cases, of *P. cynomolgi* in monkeys. The most powerful schizonticide of the series proved to be 2 : 4-diamino-5-*p*-chlorophenyl-6-ethylpyrimidine (compound number 50–63), now known as "daraprim." Clinical trials in cases of quiescent human malaria were conducted in Lagos by Archibald (1951) on children aged 5 to 10 years; promising results were obtained and no toxic effects were observed. A supply of daraprim having been made available in August, 1951, a clinical trial on subjects having overt attacks of malaria was undertaken at the Medical Research Council's Field Research Station, Fajara, Gambia, between August and November, 1951.

Subjects and Methods

Subjects were selected who showed high levels of parasitaemia and fever and other manifestations of clinical malaria. They were divided into four trial groups consisting of 18 infants (group I), 7 older children (group II), and 4 adults (group III) infected with *P. falciparum*, and 3 small children (group IV) infected with *P. malariae*. Unlike the children investigated by Archibald (1951), these subjects showed considerable variation in the degree of acquired malarial immunity which they possessed. The infants in group I had little or none; the adults in group III all exhibited substantial immunity; the resistance of the children in groups II and IV varied between these two extremes. The characteristics of the groups are summarized in Table I,

TABLE I.—*Details of the Four Groups of Subjects Treated with Daraprim and of Their Parasitaemia and Pyrexia*

	Group I	Group II	Group III	Group IV
No. { Male	9	5	3	1
No. { Female	9	2	1	2
No. { Total	18	7	4	3
Age { Mean	14 months	3·75 years	36 years	3·25 years
Age { Range	4–24 ,,	2·5–5 ,,	29–45 ,,	1·5–4·5 ,,
Weight { Mean	8·0 kg.	13·1 kg.	55 kg.	10 kg.
Weight { Range	5–12 ,,	11–15 ,,	45–60 ,,	5–13 ,,
Infecting parasite	*P. falcip.*	*P. falcip.*	*P. falcip.*	*P. malariae*
Mean parasite density before treatment: Proportion of red cells infected	4·7%*			
Parasites per field of thick film		49	13	1
Pyrexia before treatment (Temperature (°F.)): Mean	102·3	103·1	All reported fever	100
Pyrexia before treatment (Temperature (°F.)): Range	100–106	101–104·5		Irregular
No. in whom spleen was: Not palpable	6	2	4	0
Just palpable	4	2	0	0
Palpable up to 3·5 cm. below costal margin	7	2	0	1
Palpable 5 cm or more below costal margin	1	1	0	2
No. in whom liver edge was: Not palpable	5	3	4	0
Palpable up to 3·5 cm. below costal margin	7	3	0	2
Palpable more than 3·5 cm. below costal margin	6	1	0	1

* 5 cases in this group had peripheral schizogony.

together with their average levels of parasitaemia and pyrexia before treatment. Among the children a number had other diseases which almost certainly contributed to their fever, so that changes in temperature cannot be wholly attributed to malaria (cf. notes to Table II). Thus five had enteritis, four had pulmonary infections, and one each had trypanosomiasis, exfoliative dermatitis, septic gingivitis, cancrum oris, and whooping-cough. The presence of these complications makes the results of daraprim treatment the more striking.

Parasitaemia was investigated by the use of both thick and thin films. Thick films were prepared by the standard method of Field (1948) and stained by Field's rapid method. Thin films were stained with Giemsa. In estimating density of infection two methods were used. In very heavily infected subjects thin films were examined and the percentage of parasitized red cells was ascertained by counting at least 1,000 cells. In less severe infections the average number of parasites per field of thick film was counted, using an oil-immersion 1/12 objective and ×8 eye-pieces in a binocular microscope. Two hundred fields of thick film were always examined. Blood films were taken at least six-hourly for the first two days after treatment and thereafter twice daily.

The drug was administered by mouth, under strict supervision by one of us, in a single dose calculated in relation to body weight. In the early cases 10-mg. tablets of daraprim were ground up with pulv. tragacanth. in a measured volume of glycerin and water to make a uniform suspension, and a volume proportional to the calculated dose was given; later 5% lactic acid was substituted for water, as the drug is said to form a stable solution in weak acids; eventually a syrup prepared by Messrs. Burroughs, Wellcome and Co. containing 5 mg. of daraprim per ml. was used exclusively.

The drug is quite tasteless, and little or no difficulty was experienced in getting even very ill babies to swallow their dose.

Results

Eight babies in group I received the drug at a dosage level of 0.25 mg. per kg. of body weight, as did all the adults. The remaining cases received 0.5 mg. per kg. The results are summarized in Table II. It will be seen that in

TABLE II.—*Results of Treatment with Daraprim in the Four Groups of Subjects*

	Group I		Group II		Group III	Group IV
Parasite	*P. falcip.*		*P. falcip.*		*P. falcip.*	*P. malariae*
No. of subjects	18		7		4	3
No. given 0·25 mg. per kg.	8		1		4	
No. given 0·5 mg. per kg.		10		6		3
No. in whom asexual parasites were still present after:						
24 hours	8	10	1	6	4	3
48 ,,	7	8	1	3	1	3
72 ,,	1	1	0	0	0	3
96 ,,	1	1	0	0	0	0
More than 5 days	1*	1†	0	0	0	0
No. in whom temperature was still raised after:						
24 hours	6	9	1	5		3
48 ,,	2	5	0	1		1
72 ,,	1	1	0	1	0	1
96 ,,	1	1	0	0		1
More than 5 days	0	1‡	0	0		1§

* Case 11. See discussion. † Case 10. See discussion. ‡ Case 5. Pulmonary infection and enteritis. § Case 31. Septic gingivitis.

all *P. falciparum* infections except two asexual parasites had disappeared from the peripheral blood within 72 hours of treatment and that in most cases the temperature had reached normal by that time. The rate of disappearance of parasites from the blood seemed to be unrelated to previously acquired immunity. In two instances parasites did not disappear from the peripheral blood. In the first (Case 11), a child of 13 months who received 0.25 mg. per kg., the parasitaemia was reduced to a level of 1 parasite in 200 fields on the fifth day; thereafter parasite density increased to a level of .8 per field in 10 days. A second dose of the drug was given 15 days after the first at the rate of 0.5 mg. per kg.; parasites disappeared from the blood within 72 hours and did not return. In the second case of failure (Case 10), a child of 10 months, there had been a seemingly satisfactory response to 0.25 mg. per kg. when the child was first treated, but she was brought back 14 days after discharge with a heavy parasitaemia, which did not respond to dosages of 0.25 mg. per kg. given on two occasions and of 0.5 mg. per kg., given once at approximately weekly intervals.

In five of the *P. falciparum* cases, in which treatment had been given very shortly after the first appearance of parasites, no gametocytes were ever seen in the peripheral blood. In all the remaining cases gametocytes appeared in variable numbers, usually reaching a peak on the fifth day after treatment and persisting on an average 12 days. The longest period for which gametocytes were observed to persist was 26 days. The gametocytes appeared normal, and in two cases apparently normal exflagellation was observed. We were not able to test the fertility of gametocytes after treatment by observing their development in mosquitoes.

In the three quartan cases asexual parasites persisted in diminishing numbers beyond 72 hours, but were always absent 96 hours after treatment. Gametocytes were seen in all three cases, and persisted for six, eight, and twelve days respectively.

Relapses.—In this hyperendemic area, at a season when transmission is high, the chances of reinfection within a short time after discharge from hospital are considerable. Six patients returned with parasites in the blood after intervals of 37 to 60 days. The nature of these parasitaemias was more suggestive of reinfection than of relapse, but we have no evidence on which the occurrence of relapse can be excluded or established.

Effects of Daraprim on the Morphology and Development of Parasites

In 18 of the 29 cases of *P. falciparum* malaria no change was discernible in the morphology and development of ring-form trophozoites before they disappeared from the blood. However, from the moment of administration, invasion of red cells by merozoites ceased abruptly. From the 24th to the 48th hour after treatment trophozoites in the blood of 10 subjects showed abnormalities. There was retardation or cessation of growth, the chromatin became pyknotic and stained deeply, and the cytoplasm became pale, attenuated, and extremely fragmented. Similar changes were seen in one case within the first 24 hours.

In the five cases with late-stage solid trophozoites and schizonts in the peripheral blood, treatment caused rapid disappearance of mature schizonts. A small number of immature segmenting forms were seen in which chromatin division was most irregular—the daughter fragments varying greatly in size and staining properties—and in which the cytoplasm stained faintly and showed vacuolation.

The main factor governing the diminution in parasitaemia after treatment seemed to be the age of the trophozoites at the time the drug was given. Except in the one case, in which there appeared to be a direct and immediate effect on the trophozoites, reduction of parasitaemia did not occur until the time at which the parasites would normally have been expected to withdraw from the peripheral circulation to undergo schizogony in the internal organs. Thereafter no asexual parasites were seen in the blood.

If at the time of drug administration the bulk of the trophozoites were well grown, a pronounced fall in density was observed during the 24 hours after treatment—the precise time coinciding with the estimated time for normal withdrawal—but when the treatment was given shortly after schizogony, most of the trophozoites being very young, no noticeable decline in parasitaemia was seen until after the 24th hour.

All three cases of quartan malaria showed asynchronous infection, with parasites at all stages of development. After administration of daraprim, mature schizonts disappeared rapidly from the blood and no further infection of red blood cells with merozoites took place. Parasites reaching the stage of schizogony were the first to show abnormal morphological changes. In some instances the chromatin failed to divide. It persisted in a single mass and became pale-staining and diffuse. Chromatin division, when it occurred, was irregular and gave rise to daughter fragments of varying size around which the cytoplasm did not condense. The cytoplasm stained poorly and often showed vacuolation. Occasionally extrusion of some pigment from the cytoplasm was noted. Growing ring trophozoites were normal in appearance until the stage of schizogony was reached, when the changes described above became apparent, but their persistence in the blood for some hours beyond the normal 72 hours of the quartan cycle suggests a growth-retarding effect of the drug.

Toxicity of Daraprim

In two cases vomiting occurred after administration of the drug. An infant suffering from whooping-cough vomited immediately after its dose; a second dose was given and retained. A child, who on the previous day had undergone a liver-function test and vomited severely after ingestion of sodium benzoate, vomited 40 minutes after the administration of daraprim. The dose was not repeated. As already noted, a number of children had enteritis, but in no case could this be attributed to daraprim. No skin rashes were seen and, although detailed urinary investigations were carried out, there was no evidence of toxic renal damage. Regular blood counts were performed, but no depression of haemopoiesis was found; indeed, all cases showed swift regeneration of blood with rapidly rising counts and haemoglobin levels, often with considerable reticulocytosis, after

treatment. In no case was there a significant lowering of the white-cell count. A rising eosinophilia, reaching a peak at an average of five days after treatment, was noted in seven cases: in three of these the proportion of eosinophils rose from 1% to 5%; in two cases it reached 13%; and in two it exceeded 25%. No toxic phenomena unequivocally attributable to daraprim were noted.

Discussion

Daraprim is clearly a powerful schizonticide. A single dose of 0.5 mg. per kg. of body weight causes the disappearance of asexual forms of *P. falciparum* and *P. malariae* from the blood in the great majority of cases, at a rate which is not dependent on the degree of immunity possessed by the host. While in a minority of cases there is some evidence of action upon ring trophozoites, the drug seems to exert its effect mainly at the stage of plasmodial development, when the chromatin is in active division. The evidence presented suggests that after a single dose the concentration of the drug in the blood remains high enough to be lethal to all the asexual forms, even if some do not reach the vulnerable phase of schizogony for 72 hours after treatment, as in the quartan cases.

In two cases asexual parasites persisted in the blood stream. It seems reasonable to attribute the first of these failures (Case 11) to underdosage, since a second treatment at a higher dosage (0.5 mg. per kg.) was rapidly effective. The cause of the second failure (Case 10) is more obscure. In this case the infant on admission had a severe generalized exfoliative dermatitis, and on examination the edge of a very hard liver was palpable a hand's breadth below the costal margin. A considerable degree of metabolic disorder, including impairment of liver function, may be inferred. Should the antimalarial activity of daraprim depend upon the disintegration of the drug into some metabolite, it may be that the impaired liver function interfered with this process and prevented the establishment of an adequate concentration of the active substance in the blood. However, the possibility that the failure was due to the presence of a naturally resistant strain or to the establishment of drug resistance by previous inadequate treatment—in this case at a dosage level of 0.25 mg. per kg.—cannot be excluded.

Our experience is that daraprim promises to prove a valuable antimalarial drug. Its action seems to parallel closely that of proguanil ("paludrine"), while the rate at which it eliminates parasitaemia seems to be intermediate between that of proguanil and chloroquine. Its small effective dosage and tasteless character may well make this the drug of choice in the treatment of malaria in infants and children. It certainly merits extended trials, both therapeutic and prophylactic, against the known strains of plasmodia infecting man.

Summary

Cases of clinical malaria with high parasitaemia and pyrexia, due in 29 cases to *P. falciparum*, and in three to *P. malariae*, were treated with daraprim in single oral doses of 0.25 or 0.5 mg. per kg. of body weight.

The drug has a powerful destructive action on dividing schizonts and a lesser and inconstant effect on trophozoites. The blood was free of asexual parasites within 72 hours in all but two cases of *P. falciparum* infection and within 96 hours in all cases of *P. malariae* infection. No toxic effects were observed.

The drug seems to act just as swiftly in non-immunes as in subjects who possess considerable immunity.

As daraprim is tasteless it is particularly suitable for the treatment of malaria in infants and children.

Daraprim well merits extended trial as a therapeutic drug effective in very small single doses, and its efficacy as a suppressive deserves investigation.

We gratefully acknowledge our indebtedness to Brigadier J. S. K. Boyd, Director of the Wellcome Laboratories of Tropical Medicine, for his help and advice throughout this investigation and for making available to us supplies of daraprim and early information about its properties; and to Professor B. S. Platt, Director of the Medical Research Council Field Research Station, Gambia, for making it possible for us to do this work and for permission to publish this paper.

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DARAPRIM (B.W. 50-63)—A NEW ANTIMALARIAL

TRIALS IN HUMAN VOLUNTEERS

BY

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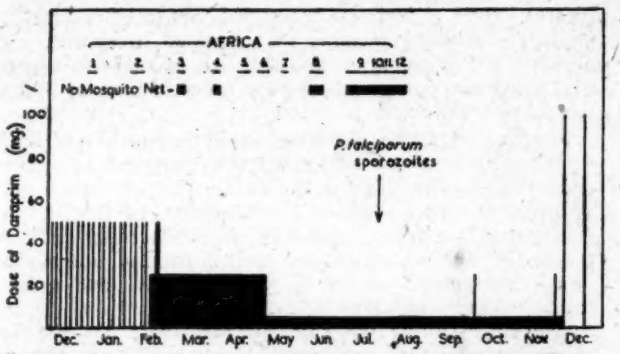
2:4-diamino-5-*p*-chlorophenyl-6-ethylpyrimidine, "B.W. 50–63," or "daraprim," is a new antimalarial drug of high potency. Laboratory tests have shown it to be 60 times as active as proguanil against *Plasmodium gallinaceum* in chicks and 200 times as active against *P. berghei* in mice (Falco *et al.*, 1951). A single dose of 5 mg. was found by Archibald (1951) to clear *P. falciparum* schizonts from the blood of Lagos schoolchildren. Daraprim worked rather more slowly than mepacrine, but the 5-mg. dose was approximately equivalent to a dose of 300 mg. of mepacrine tested under the same conditions. Toxicity tests in the laboratory showed that the drug was less toxic than proguanil to mice; doses of 5 mg. per kg. of daraprim given twice daily to a rhesus monkey for five days every week for six weeks had no effect on the general health, appetite, or the blood picture. We estimated that if it could be assumed that human malaria parasites were as sensitive to daraprim as *P. cynomolgi*, an effective suppressive dose for a 70-kg. man would be of the order of 5 mg. once weekly. This is not, of course, a justifiable assumption, but we thought it reasonable to expect that a dose of 25 mg. once weekly would be effective as a suppressant in human malaria. The present paper is an account of a personal trial of the drug as a malaria suppressant, and of toxicity studies in a group of human volunteers.

A Personal Trial

From January to June, 1951, I was working in Africa, and therefore had the opportunity of making personal trials with daraprim. The aims of the trial were (*a*) to take the drug at a dose level higher than was necessary for the suppression of malaria and watch carefully for any toxic effects, and (*b*) to ensure that I came into contact with infected mosquitoes.

Dose of Drug.—A beginning was made by taking 50 mg. of daraprim twice weekly. This dosage was continued from December 5, 1950, until February 11, 1951, and no ill effects of any kind were observed. The blood picture and the urine were normal throughout. As I was spending a good deal of time in the bush and it needed an effort to remember which days to take the drug, I changed to a higher total dose of 25 mg. daily, which was continued from February 12 until April 4. Again no ill effects were observed. On February 5 I had diarrhoea after an expedition to Kankara, in Katsina Province; this responded rapidly to treatment with sulphaguanidine. I had two boils, which appeared on



Key to Chart.—The time in malarious areas was spent at Vom, Plateau province, Nigeria, with the exception of: (1) Lagos; (2) Kaduna (Zaria province) and Kankara (Katsina province); (3 and 4) Shendam (Plateau province); (5) trek from Vom to Kaduna (Plateau and Zaria provinces); (6) Lagos, Ibadan, and Kaduna; (7) Lumu (Zaria province); (8) Wase, Shendam, Makurdi, Nassarawa (Plateau and Benue provinces); (9) Belgian Congo (Leopoldville, Elisabethville, Stanleyville, and Costermansville; (10) East Africa (Entebbe, Nairobi); (11) Khartoum; (12) Italy.

March 18 and April 19, and blood counts made at each of the times showed a good leucocyte response, with a high proportion of young polymorphonuclear cells. By April 4 Dr. Archibald reported to me the preliminary results with daraprim in schoolchildren, and it was clear that 25 mg. daily was more than sufficient for malaria suppression. The dose of drug was therefore reduced to 5 mg. daily, and this I continued to take until the end of the year. On February 16, 17, and 18 doses of 50 mg. were taken, and on October 1 and November 26 doses of 25 mg. Doses of 100 mg. were taken on December 4 and 19 for the purpose of estimating blood levels of the drug. A full blood count made by Dr. M. Maizels at University College Hospital confirmed that the blood picture was normal after the year's experiment, and a sternal puncture showed a normal bone marrow. There was no abnormality of the urine at any time, and the drug had no effects at any dose level tried upon appetite or digestion. Some figures obtained from routine blood examinations are recorded in Table I.

TABLE I.—*Blood Counts Made During a One-year Course of Daraprim*

Date	Total Dose of Drug (g.)	Hb %	Red Cells (×10⁶)	White Cells (×10³)	Differential Count				
					Poly.	Lymph.	Mono.	Baso.	Eo.
5/12/50	0	105	4·9	10·0	66	24	10	1	0
6/1/51	0·450	102	5·1	7·3	56	32	10	2	0
20/2/51	1·250	120	5·0	9·1	63	31	4·5	0·5	1
18/3/51*	1·900	110	5·0	12·4	68	20	10	1	1
19/4/51*	2·700	110	5·0	16·0	72	23	4	0	1
3/12/51	3·785	110	5·1	9·7	56	33	9·5	1	0·5
4/12/51†		104	5·2	6·8	55·5	37·5	6	0·5	0·5

* Polymorphonuclear leucocytosis due to boils.
† Independent determination by Dr. M. Maizels.

Bone marrow on December 11 (Dr. E. Graves): neutrophils, 24; eosinophils, 1; basophils, 0; lymphocytes, 10; monocytes, 0; myelocytes, 28; "blast" cells, 2.5; plasma cells, 1; reticulum cells, 0; proerythroblasts, 2.5; normoblasts, early 3.5, intermediate 9, late 18.5; megaloblasts, 0; megakaryocytes in normal numbers.

Infection with Malaria.—Most of my stay in Africa took place during the dry season and was spent on the Jos Plateau; mosquitoes were not very plentiful. However, several expeditions were made into the bush, and on three of these occasions I slept without a mosquito net. I very seldom wore socks during the evening and never wore mosquito boots. There is little doubt that I met the infection on more than one occasion. On my way back to England I took the opportunity of receiving an inoculation of *P. falciparum* sporozoites from four *Anopheles gambiae* mosquitoes at the I.C.I. research station in Nairobi prison. Sporozoites were shown to be present in the salivary glands of the mosquitoes when the insects were dissected after biting. No malarial attack followed this infection.

It is unjustifiable to draw far-reaching conclusions from observations upon a single experimental animal. However, the results described show that daraprim at a dose level of 5 mg. daily proved to be a satisfactory suppressant of *P. falciparum* malaria, and produced no ill effects of any kind when given continuously for a year.

Toxicity Trials in England

Thirteen volunteers in England took 50-mg. doses of daraprim twice weekly for three months. In 11 persons there were no unpleasant symptoms of any kind; in two there were complaints of slight gastro-intestinal upset, which was not experienced when the daraprim tablets were replaced by dummies without the knowledge of the volunteers. However, a further trial of two doses of either daraprim or dummy tablets in a fresh group of 40 persons showed that complaints were made by a higher proportion of the 20 who took dummies than by the 20 who took daraprim.

In the people who took daraprim no significant changes were observed in red or white cell counts, sedimentation rates, or in the urine (Table II).

TABLE II.—*Blood Examinations upon Normal Volunteers taking Daraprim (50 mg. twice daily for 3 months)*

Sex and Age	Date	Hb %	R.B.C. (×10⁶)	Packed Cell Volume (%)	W.B.C. (×10³)	Differential Count				
						Poly.	Lymph.	Mono.	Eo.	Baso.
F 28	*6/12/50	95	4·6		7·0	62	29	6·0	2	1
	18/12/50	96	4·7		5·8	52	42	5·5	0	0·5
	16/1/51	98	4·5		8·0	54	37	7·5	0·5	1
	25/4/51	98	4·8		6·8	51	43	3·5	1	1·5
M 26	*6/12/50	106	4·9		7·3	61	32·5	4·5	2	0
	18/12/50	108	5·2		7·8	59	33	5·0	1	2
	4/5/51	108	5·2		7·2	61	33·5	6·5	2	2
M 25	*4/1/51	108	5·5		6·6	65·5	30·5	2·5	0·5	1
	1/5/51	108	5·3		7·2	52·5	39·5	4·5	2	1·5
M 35	*18/12/50	100		44	9·6	52	32	5	1	—
	17/1/51	97		45	6·0	52	38	9	1	—
M 34	*18/12/50	102		44	5·4	60	30	8	2	—
	17/1/51	100		44	5·4	59	33	7	1	—
	5/2/51	98		44	4·8	60	33	5	2	—
M 39	*18/12/50	98		44	10·0	71	22	3	4	—
	17/1/51	104		44	12·0	74	20	6	0	—
	5/2/51	100		44	12·6	68	24	6	2	—
	19/3/51	105		44	11·0	67	29	3	1	—
M 46	*18/12/50	108		49	5·8	61	32	5	2	—
	17/1/51	105		48	5·0	59	33	8	0	—
	5/2/51	104		48	6·4	56	36	8	0	—
	19/3/51	102		47	9·8	62	29	5	4	—
†M44	*18/12/50	112		47	6·5	63	27	8	2	—
	17/1/51	106		46	7·6	66	29	4	1	—
	19/3/51	105		47	6·6	58	36	4	2	—
M 47	*18/12/50	96		46	9·6	65	23	7	5	—
	5/2/51	95		44	6·8	62	32	5	1	—
M 28	*18/12/50	102		48	6·2	57	29	6	8	—
	17/1/51	106		45	5·4	55	33	8	4	—
	5/2/51	102		47	5·6	59	33	8	0	—
	19/3/51	100		45	7·0	48	40	10	2	—
M 30	*18/12/50	98		46	9·0	59	27	8	6	—
	17/1/51	102		44	8·8	54	40	5	1	—
	5/2/51	100		43	6·6	59	36	4	1	—
	19/3/51	98		44	9·8	65	30	4	1	—
†M47	*18/12/50	98		48	5·2	53	37	9	1	—
	17/1/51	98		44	6·4	62	30	6	2	—
	5/2/51	98		45	5·2	55	37	8	0	—
	19/3/51	105		45	6·8	52	44	4	0	—
M 45	*18/12/50	103		46	6·0	52	36	6	6	—
	5/2/51	106		45	5·0	57	35	7	1	—
	19/3/51	105		45	6·6	55	34	9	2	—

* Blood counts made before beginning course of daraprim.
† Slight gastro-intestinal symptoms in these two volunteers.

Summary

Daraprim (2:4-diamino-5-*p*-chlorophenyl-6-ethylpyrimidine) has been shown to be an effective malaria suppressant in one individual when given in doses of 5 mg. daily. No toxic symptoms of any kind were observed, and no abnormalities were produced in the blood or bone-marrow picture or in the urine during one year's continuous administration of the drug.

In a group of volunteers in England, doses of 50 mg. given twice weekly produced no significant effects upon

the blood picture, sedimentation rate, or urine, and the only symptoms recorded were slight gastro-intestinal disturbances in two persons.

I am indebted to Dr. H. M. Archibald for his interest and co-operation; to Dr. Robertson at the I.C.I. Unit in Nairobi for the infected mosquito bites; to Dr. J. C. Hawksley, Dr. M. Maizels, and Dr. E. Graves, of University College Hospital, for the final count upon my blood and the sternal puncture; to Dr. J. C. Broom and Dr. S. R. M. Bushby for the determinations recorded in Table II; to the volunteers who submitted to trials with the new drug; and to Brigadier J. S. K. Boyd for his encouragement and advice at all times during the experiments.

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HYPNOSIS IN CHILDBIRTH

BY

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Considerable interest has been aroused in recent years, both in this country and in the United States, in the phenomenon of hypnosis, with special reference to its application in the relief of pain during childbirth. Unfortunately the attitude of the general public and some medical practitioners towards this phenomenon has been, and too often still is, one of superstition, fear, and even open hostility. No doubt this is the result of witnessing lay demonstrations by medically ignorant and often completely irresponsible people making extravagant claims for hypnosis.

From time to time reports of cases of childbirth while under hypnosis have appeared in the lay press, arousing interest and discussion. An attempt has therefore been made to investigate these claims on a scientific basis, so far as this is possible, and it is with this idea in mind that this preliminary objective evaluation of the effects of hypnosis as an anaesthetic agent in childbirth has been undertaken.

Relief of Pain During Childbirth

In our present civilization, women have been conditioned to expect pain during childbirth, and are convinced that it is a necessary adjunct to labour. Anticipation increases pain largely through muscular and nervous tension. Following on the publication of the work of Grantly Dick Read in educating the patient in the value of relaxation, and in attempting to remove the fear and apprehension of childbirth, efforts are being made to induce the parturient woman to regard childbirth as a natural function which should cause no more discomfort than any other physiological process of the body. Read's technique depends on the use of education, relaxation, and suggestion, and by employing trance states one only carries his method a stage further.

Kroger and De Lee (1943) believe that the only method of producing relief of pain with complete safety for mother and infant, without altering the normal mechanism of labour, is hypnosis. They further maintain "that hypnosis has unrealized possibilities for making childbirth not merely the equivalent of a surgical operation but rather a satisfying psychological experience, which may fulfil a deeply felt and unformulated need of the mother." Greenhill (1947) states that hypnosis should be employed more often than it is at present. Even if complete hypnosis is not to be resorted to, physicians should remember that repeated suggestion, with or without the aid of medication, can accomplish a great deal in labour, particularly for the relief of fear, as well as the pain of childbirth.

Prior to 1775 the phenomenon of hypnosis was often described as a miracle performed by high priests of ancient civilizations, particularly in the East. The scientific history of hypnosis began with Anton Mesmer. In this country James Braid, in 1841, found that trance-like states could be induced by holding any bright object in front of, and slightly above, the subject, so as to strain the eyes and quickly fatigue them. He first coined the terms hypnosis and hypnotism. During the past 30 years there has been an increasing wealth of publications dealing with the effective use of hypnosis in the fields of psychiatry and experimental psychology. There have been papers advocating the use of hypnosis as an anaesthetic agent in surgery and dentistry. Sampimon and Woodruff (1946) described 29 surgical and dental operations successfully performed under hypnosis while in a prisoner-of-war camp in Singapore during the Japanese occupation.

Hypnosis has been used in obstetrics for many years, and Schultze-Rhonhof (1922) reported an 89.5% success rate in a series of 79 cases. He came to the conclusion that hypnosis was a useful and harmless anaesthetic agent. Isolated enthusiastic reports of labours conducted under hypnosis have appeared in recent years in the medical press, but, with the exception of papers by Kroger and De Lee (1943) and Abramson and Heron (1950), no large series of cases have been reported in the English language. It should be pointed out at this stage that in Abramson and Heron's series of 100 cases the experimental group of patients (receiving hypnosis) were each given a mean amount of 103.5 mg. of pethidine during labour, whereas the control group of patients (not receiving hypnosis) received a mean of 123.6 mg. of pethidine. In the series of 30 cases reported here only those cases which failed completely during labour received anaesthetic agents.

Present Investigation

Material.—All subjects in this series were volunteers and were obstetrically normal at the 34th–37th weeks of pregnancy. No attempt was made to select patients, and only one case was rejected during the antenatal period. This patient could not be hypnotized after three attempts, and, owing to pressure of work, it was not deemed practicable to continue with this case. Vogt, of Berlin, with typical Teutonic thoroughness, persevered with one case through 600 attempts and 700 with another before inducing hypnosis (Le Cron and Bordeaux, 1949). All volunteers were drawn from patients attending the antenatal clinics of this hospital, and no elaborate preparations were made to secure optimum conditions for hypnosis.

Antenatal Preparation.—Patients were seen at varying intervals during the antenatal period in order to hypnotize them and to accustom them to the routine. A semi-reclining position on the examination couch in an undarkened room was adopted, and in order to secure fixation of attention the gaze was focused on a fixed point

TABLE I.—*Analysis of Cases in Which Hypnosis Failed During Labour*

Case	Age	Parity	No. of A.N. Training Sessions	Depth of Hypnosis* Obtained During A.N. Sessions	Stage of Labour Hypnosis Failed
A	19	1	10	4	1st
B	16	1	6	3	"
C	33	2	7	3	Beginning of 2nd
D	35	4	3	4	" " "
E	36	2	11	4	Crowning of head
F	23	2	2	3	" " "
G	27	2	11	5	" " "

* Depth of hypnosis referred to in this column is in accordance with Le Cron and Bordeaux's classification.

TABLE II.—*Analysis of Cases in Which Hypnosis Succeeded*

Case	Age	Parity	No. of A.N. Training Sessions	Depth of Hypnosis* Obtained During A.N. Sessions	Remarks (Behaviour in Labour)
1	27	2	10	3	Excellent
2	31	2	10	5	V. good
3	30	2	5	3	,,
4	33	2	7	4	Good
5	29	4	7	4	V. good
6	21	1	6	4	Excellent
7	28	2	8	3	,,
8	29	1	9	3	,, (episiotomy sutured)
9	40	2	7	4	Excellent
10	19	1	11	4	,,
11	33	3	5	3	Good
12	25	2	6	4	Excellent (laceration sutured)
13	29	1	4	3	Excellent (second-degree laceration sutured)
14	27	2	5	3	V. good
15	23	2	9	4	,,
16	23	2	8	3	Excellent
17	30	2	9	5	,,
18	40	3	5	4	,,
19	24	2	6	4	,,
20	28	3	5	4	,,
21	25	3	9	4	V. good
22	32	2	8	4	Good
23	25	2	10	4	First stage excellent†

* Depth of hypnosis referred to in this column is in accordance with Le Cron and Bordeaux's classification.
† This case was deliberately awakened in the second stage.

on the ceiling. These training sessions varied from two in number in one case to 11 in two others. No attempt was made to standardize the number of training periods given to each patient, and it was found that the number of training sessions per patient had no direct bearing on the resultant behaviour of the subject during labour (Tables I and II). No patient was seen before the 34th week of pregnancy, and one case was seen for the first time as late as the 39th week, 10 days before delivery.

Depth of Hypnosis

Various trance stages are known and fairly easily recognized, although no clear line of demarcation between these stages exists. In spite of many attempts to separate them, no classification has as yet been generally accepted. For general purposes five divisions of the various stages of susceptibility have been found to be quite satisfactory, with three of these designating actual hypnosis (Le Cron and Bordeaux, 1949): (1) insusceptible; (2) hypnoidal—some symptoms but no trance; (3) light trance; (4) medium trance; and (5) deep or somnambulistic trance.

In the training sessions attempts were made to get as deep a degree of hypnosis as possible, and the response differed from case to case because of the great variability in the susceptibility of the subjects. Similarly the depth of hypnosis varied with the experience and ability of the operator. Simple tests were performed in an attempt to gauge the depth of the trance. Here it should be stressed that patients apparently reaching a deep trance during the training sessions did not necessarily prove to be ideal subjects during the actual childbirth (Tables I and II).

Technique of Inducing Hypnotic Trance

This has been comprehensively dealt with in innumerable publications, and it has been found that any acceptable method of trance induction is suitable. During the antenatal period steps should be taken to establish rapport between the patient and those who will be ultimately responsible for her nursing during delivery. This can be quite easily established by careful and sympathetic discussion with the patient while she is in the trance state. It will prove of great value to the obstetrician in charge of the delivery, as his presence at the bedside is thus not required to so great an extent, since the midwife can "reinforce" the subject with a few suggestions of sleep, should she show signs of awakening.

During the training sessions the hypnotized subject is assured that as labour is a physiological process it should be no more uncomfortable than any other function of the body. In addition, the events occurring during a normal labour are explained to the patient. (It is assumed that the patient has already received some instruction in the physiology of the antenatal period. At this hospital, patients receive three lectures on the physiology of pregnancy, labour, and the puerperium.)

At each session post-hypnotic suggestion is given that labour will be painless, and that the only sensation the patient will experience will be a feeling of tightness in the lower abdomen and lower back during the uterine contractions. While under hypnosis the subject is told that she will look forward to the actual confinement with a feeling of confidence rather than one of fear and apprehension. During these antenatal training sessions the subjects are taught to relax, and post-hypnotic suggestion is given that when in labour they would remain relaxed with each uterine contraction. Relaxation is a condition which can be easily induced in the hypnotic state, and is much more complete than that which the subject can otherwise accomplish. After waking from the trance the subject has no recollection of the suggestion which has been given until it arises in her mind at the stated time or occasion.

The application of mass hypnosis during the training sessions has proved invaluable as a time-saving factor. This was introduced to the patients after they had been hypnotized alone on the first two occasions. Thereafter they were hypnotized in batches of six with satisfying results. In most cases it will be found that after the first session hypnosis can be induced merely on command, and thereafter the trance state can be deepened by appropriate suggestion.

Management During Labour

Properly trained, the subject should be able to hypnotize herself when labour begins, or during the training sessions post-hypnotic suggestion can be given to her to the effect that she would enter the trance state at the appropriate time. This, however, is not always satisfactory, as many will do this at the beginning of false labour. A few cases were instructed to enter the trance state only after admission to the labour ward—that is, after they had been seen and attended to by the midwife in the admission room. The most satisfactory method was for the obstetrician to give the command to the subject after she had been examined by him personally, and after he was convinced that labour was well established and the os at least two fingers dilated. At this stage the patient is again told that her sleep will be deep and continuous and that she will hear only the commands of the obstetrician-hypnotist and the attendant midwife. The subject is told to carry out all the instructions given to her by the midwife, and should any examinations (abdominal, rectal, or vaginal) be necessary they would cause no discomfort at all.

The normal mechanism of labour is not interfered with, and patients are found to be very co-operative, especially in the second stage of labour, at which time the expulsion of the baby is aided by the voluntary powers of the subject. If labour is somewhat prolonged, it has been found useful to waken her for short intervals, during which time meals can be taken, and bowels and bladder be attended to. These functions can, however, be carried out even while the patient is in the trance state.

It is advisable for the hypnotist to be present continuously during the second stage of labour, as it was during this expulsive stage that the majority of failures in this series occurred. During this stage, patients are instructed to bear down with each contraction, which they recognize by the tightness in lower abdomen and back. Immediately after each contraction, in this stage, the patients are "reinforced" with a few suggestions of sleep and told to relax completely. When the perineum is being distended by the presenting

part the perineal area is "anaesthetized" by repeated suggestion to the hypnotized patient. In most subjects episiotomies can be performed quite painlessly, and subsequent repair effected without a local or general anaesthetic. After "anaesthesia" has been invoked, it must always be removed and that part of the body returned to a normal condition of sensitivity before waking the patient.

The third stage of labour is also conducted with the patient in the trance state, and she is awakened only after she has been made comfortable following on the expulsion of the placenta.

Kroger and De Lee state that in the management of the prenatal period "post-hypnotic suggestion is given to the effect that the labour will be painless, *and that the subjects will have no recollection of the entire procedure.*" In this series of cases the patients have been kept informed of the progress of labour, and there can thus be full conscious co-operation and participation by the mother in the birth of her child. This is said to be psychologically desirable.

In an attempt to assess the objective rather than the subjective effects of hypnosis in childbirth it was thought advisable to have for comparative purposes a control group of patients. These were obtained, after the experimental cases had been delivered, by referring to the hospital admission book and extracting therefrom details of normal deliveries of women, of similar parity, admitted to hospital immediately after the appropriate experimental cases. Tables III and IV show the mean age and parity of the patients in the two groups.

TABLE III.—*Mean Age of Patients (in years)*

	Control Group	Experimental Group
Multigravidae (24 cases) ..	27·70	29·96
Primigravidae (6 „ ..	25·50	22·67
Total (30 „) ..	27·27	28·50

TABLE IV.—*Mean Parity of Patients*

	Control Group	Experimental Group
Multigravidae (24 cases) ..	2·26	2·33
Total (30 „) ..	2·00	2·07

Results

In this series there were six primigravidae and 24 multigravidae. In view of the fact that the duration of labour in a normal case definitely varies according to whether the subject is a primigravida or a multigravida the two groups have been treated independently. Application of "Student's" t test shows that only in the second stage of labour in respect of the primigravidae is there a statistically significant difference (at the 5% level) between the control group mean of 88 minutes and the experimental group mean of 37 minutes (Table V). In spite of the fact that statistically, with the above exception, there is no significant difference in the above figures, the difference of the means between the control and experimental groups of both classes of patient indicates a tendency in favour of the treatment of the experimental group (Table V). The reasons for the virtual failure to pass the significance tests are, first, the small series of cases, and, secondly, the very great variations apparent in any single group.

TABLE V.—*Duration of Labour*

Stage of Labour	Primigravidae		Multigravidae	
	Control	Experimental	Control	Experimental
	Hr. Min.	Hr. Min.	Hr. Min.	Hr. Min.
First	17 22	13 30	10 14	9 59
Second ..	1 28	0 37	0 29	0 35
Total duration	19 4	14 22	10 58	10 45

First Stage of Labour.—Of the 30 cases in the experimental group, 28 behaved extremely well during this stage of labour while under hypnosis. It must be again stressed that not one of these patients received any analgesia throughout this time. Co-operation was good and relaxation excellent. The two failures were young primigravidae, aged 16 and 19 respectively, who were brought into hospital after many hours of strong labour at home, and who were delivered within three and two hours respectively after admission to the labour ward. All attempts at inducing hypnosis in these two cases failed, as they were being subjected to repeated strong contractions occurring at short intervals.

Second Stage of Labour.—Analysis of the behaviour of the patients in this stage reveals that of the remaining 28 cases 25 were extremely satisfactory, co-operating well and carrying out all instructions. One woman was deliberately awakened at the beginning of the second stage of labour, following on an excellent first stage, as both the obstetrician-hypnotist and the midwife, with whom rapport had been established, were forced to leave her. The other two failures in this stage were both multiparae, one of whom attended seven antenatal training sessions, and the other only three. No difficulty was experienced in hypnotizing these two women during the antenatal period, and no explanation for their failure in this stage can be advanced (Table I).

Finally, three further cases failed during the actual delivery of the infants. Thus of the original 30 cases, 22 (73%) had completely painless labours. A corrected percentage should exclude the patient deliberately awakened, and this figure should then be 76.

Discussion

An attempt has been made to show that painless childbirth can be achieved without resort to analgesia or anaesthesia. In an entirely unselected series of 30 cases, 76% had completely painless labours, without having received any drug whatsoever, and it is felt that with proper selection of cases this figure could be improved upon. Though statistically there was no significant difference in the duration of the first stage of labour between the experimental and the control groups, it was noted that the patients in the former group were most restful and co-operative, and required less attention than the patients not receiving hypnosis. This impression was gained by the nursing as well as the medical staff, and was all the more welcome and valuable because at the beginning of the series they were sceptical, and often openly hostile to the experiment.

Subsequent discussions with the patients taking part in this experiment revealed that they were all very pleased with the experience they had undergone. Even the "second-stage failures" reported that they had had marked relief from pain and discomfort until such time as hypnosis failed; even then they were not unduly distressed by the nature of the uterine contractions, and found that they could relax completely in the intervals between contractions. Only one woman expressed a desire for analgesia in the event of a subsequent pregnancy.

The percentage of individuals that can be hypnotized is disputed by various authors, but in this series only one case was rejected, as she could not be hypnotized after only three attempts. A possible explanation of the high percentage of hypnotizable subjects obtained in this series is that the pregnant woman is in a more than usually suggestible state and so is an exceptionally good subject for hypnosis; also, in addition, volunteers are particularly likely to be suitable patients. One of the greatest difficulties in the practice of hypnotism, however, is the unreliability and unpredictability of its effects.

One possible drawback to the use of hypnosis is the time expended by the hypnotist during the prenatal training period. This, as has already been stressed, can be overcome by the introduction of mass hypnosis. Also, by establishing rapport between the patient and the attendant midwife, the

hypnotist is not required to be present at the bedside during the first stage of labour. The training of the labour ward staff in the management of the hypnotic patient in labour is most important, and can be easily accomplished. The main points to be observed in the handling of the patients are quietness and gentleness, and prior to the performance of any manipulative procedure the patient should be informed of what is about to be done.

Doubt exists in the minds of some about the safety of hypnosis. In a leading article in the *British Medical Journal* (1949) the following statement appears: "There is no evidence that in capable and conscientious hands hypnotism, repeated as many times as is desired, carries with it any physical or psychological danger to the patient." The question of a disturbance in the normal mother–child relationship has been raised, but it is felt that this relationship, rather than being impaired, is actually enhanced, as the mother retains no unpleasant memories of the childbirth, and therefore has no opportunity, either consciously or subconsciously, to blame the infant for any suffering she may have experienced.

Summary

An attempt has been made to show that prenatal training in hypnosis can benefit the parturient woman by assuring relaxation and abolishing the pain of labour.

There is evidence to show that the duration of labour is shortened.

The nursing staff can be easily trained to deal with the hypnotic patient, and it is submitted that this method is both practicable and safe for the mother and infant.

I wish to express my thanks to Miss D. Daley for permission to undertake this investigation in her department. In addition, thanks are due to Miss E. Wilson and to the medical and nursing staffs of the department of obstetrics and gynaecology for constructive criticism and help, and to Mr. Harris Schermann for preparation of the statistical data.

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DIABETES MELLITUS IN SURGICAL PATIENTS

BY

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Every week two or three diabetic patients are admitted to the surgical wards of the Royal Infirmary of Edinburgh. Thus the problems which arise in the care of diabetics undergoing surgical treatment are common. This paper discusses the subject from the medical point of view and refers to a series of 300 cases treated during 1948, 1949, and 1950, excluding obstetrical patients and those admitted for extraction of teeth. The management of the diabetes in all these patients has been the responsibility of one medical charge.

Age Distribution

Table I shows the ages of 300 consecutive surgical diabetics arranged in five-year groups. Most of the patients were over 55 years old when they required surgical treatment, and

TABLE I.—*Age Distribution*

Age Group in Years	No. of Patients	Age Group in Years	No. of Patients
1–5	0	56–60	50
6–10	0	61–65	60
11–15	3	66–70	48
16–20	5	71–75	36
21–25	2	76–80	22
26–30	6	81–85	2
31–35	5	86–90	0
36–40	12	91–95	1
41–45	14	96–100	0
46–50	16		
51–55	18		300

a considerable proportion were over 70. Few were young. These facts have an important bearing on the difficulties to be anticipated in dealing with the surgical diabetic. Degenerative disease, particularly of the cardiovascular system, becomes apparent in many diabetics at an earlier age than in other patients. Such degeneration plays a part in determining the mortality rate and type of treatment required. Many of the more serious problems which arise in the surgical treatment of diabetics are those encountered in the surgery of the aged.

The Surgical Disorders

Table II shows the incidence of some of the conditions which called for surgical treatment in this series of cases. Gangrene of the foot was the most common single disorder,

TABLE II.—*Incidence of Conditions Necessitating Surgical Treatment*

Cardiovascular disease:		
Gangrene of foot	50	
Hypertension	1	
Intermittent claudication	2	55
Angina pectoris	1	
Femoral vein thrombosis	1	
Eye diseases:		
Cataract	40	
Glaucoma	6	55
Others	9	
Infections:		
Abscesses	14	
Carbuncles	11	
Cellulitis	6	59
Acute otitis media	8	
All others	20	
Trauma:		
Fractured femur	18	34
Others	16	
Neoplastic disease: All types	30	
Miscellaneous	67	
	300	

and cataract was the next. There were 59 patients with infective lesions, a considerable proportion of which were of staphylococcal origin. Under the heading "all others" were cholecystitis, appendicitis, pyelonephritis, and similar disorders. Fractures of the femur and neoplastic diseases were common, as they tend to be in elderly patients. The miscellaneous group consisted of a great variety of diseases without any particular connexion with diabetes.

Untreated Diabetes

As many as 41 of the patients in this series were not known to have diabetes mellitus at the time when they were admitted to the surgical wards. Of these 41 undiagnosed diabetics only 5 were under 50 years of age, while 24 were over 60. They suffered from a variety of surgical disorders. Twelve had cardiovascular disease, mostly gangrene of a foot; nine had gynaecological conditions, and six had infective lesions. In two patients the recognition of the diabetes was delayed until diabetic coma developed after operation. In one of these the operation was an emergency procedure for the relief of a strangulated femoral hernia. The other was a planned operation—dilatation of the cervix and curettage of the uterus in a patient who had post-menopausal

bleeding. Both of these patients recovered. A third patient, admitted because she suffered from pyaemia with multiple abscesses, developed diabetic coma before the diabetes was recognized. There was no operation in this case. She died after the ketosis had been corrected and the blood sugar had returned to normal levels.

The discovery of these 41 hitherto undiagnosed diabetics emphasizes the necessity of testing the urine for sugar soon after the admission of any patient to a surgical ward, whatever the surgical disorder may be. The fact that even a minor operation, with a short period of anaesthesia, may precipitate diabetic coma in an unprepared diabetic makes this routine as essential as the recording of the name and address of the patient.

In these 41 patients the diagnosis of diabetes presented no difficulties. In most cases there was a history of typical symptoms, such as thirst, polyuria, pruritus vulvae, or loss of weight, together with the finding of glycosuria and sometimes ketonuria. In patients with glycosuria who did not have a typical history the finding of a fasting blood sugar higher than 120 mg. per 100 ml. was diagnostic. In none of these cases was a glucose-tolerance test necessary to confirm the diagnosis.

The Fatal Cases

Of these 300 patients 28 died during their stay in the hospital, making the overall mortality rate 9.3%. It is important to note that this figure includes all the deaths and not only those immediately attributable to the operation. In fact, in five of the fatal cases there was no operation (Table III), usually because the patient was considered to be *in articulo mortis*. Only two of the patients died within the first day of the post-operative period. In three cases the time intervening between operation and death was as long as 62, 86, and 96 days.

TABLE III.—*Details of Fatal Cases*

Sex and Age	Diagnosis	Operation	Interval Between Operation and Death	Cause of Death
M 78	Gangrene of foot	Mid-thigh amputation	39 days	Bronchopneumonia
F 67	,, ,, ,,	,, ,,	86 ,,	Myocardial infarct
F 64	Secondary carcinoma liver	Laparotomy	5 ,,	Cholaemia
M 78	Fracture neck of femur	Nil	—	Shock
F 75	,, ,,	,,	—	Pulmonary embolus
F 28	Appendicitis	Appendicectomy	5 days	Thyrotoxic crisis
F 76	Gangrene of foot	Mid-thigh amputation	14 ,,	Myocardial infarct
M 62	Carcinoma rectum. Perforation colon	Laparotomy	2 hours	Peritonitis
F 69	Gangrene of foot	Mid-thigh amputation	2 days	Bronchopneumonia
F 64	Carcinoma ampulla of Vater	Transduodenal resection	20 ,,	Hepatic failure. Duodenal fistula
F 73	Fracture neck of femur	Reduction	4 ,,	Bronchopneumonia
M 58	Thrombosis deep veins legs	Nil	—	Pulmonary embolus
F 70	Fracture neck of femur	Smith-Petersen nail	18 days	Bronchopneumonia
F 83	Fracture shaft of femur	Steinmann's pin	23 ,,	,,
M 79	Intestinal obstruction	Nil	—	,,
M 38	Carcinoma pancreas	Cholecystgastrostomy	18 days	Cholaemia
M 73	Gangrene of foot	Mid-thigh amputation	3 ,,	Pulmonary oedema. Bronchopneumonia
F 73	,, ,, ,,	,, ,,	96 ,,	Myocardial infarct
F 76	,, ,, ,,	Below-knee amputation	36 ,,	Bronchopneumonia
F 76	,, ,, ,,	Mid-thigh amputation	12 hours	Cerebral thrombosis
F 61	Staphylococcal pyaemia	Nil	—	Pyaemia. Ketosis
F 66	Carcinoma pancreas	Cholecystgastrostomy	27 days	Hepatic failure
F 70	Fracture neck of femur	Smith-Petersen nail	62 ,,	Bronchopneumonia
F 70	Abscess anterior abdominal wall	Incision	19 ,,	Pyaemia
F 61	Carcinoma stomach	Laparotomy	20 ,,	Carcinomatosis
F 72	Carcinoma rectum	Colostomy	14 ,,	Myocardial infarct
M 58	Pyloric stenosis	Partial gastrectomy	7 ,,	Peritonitis
M 65	Gangrene of foot	Mid-thigh amputation	7 ,,	Pulmonary embolus

Most of the patients who died were old. Fifteen of them were over 70 and only two were under 58. Most old diabetics suffer from degenerative vascular disease, and evidence of this was found in all patients upon whom post-mortem examinations were made. The presence of such disease certainly increases the risks of the post-operative period. Thus one patient died of cerebral thrombosis and at least four others of myocardial infarction. Six deaths occurred in the group of patients whose diabetes was undiagnosed at the time of their admission to hospital.

Nine of the fatal cases had been treated for gangrene of a foot, seven for malignant disease, and six for fracture of a femur. Thus three conditions which normally carry a high mortality rate in non-diabetic patients accounted for 22 of the 28 fatalities in this series. In only one case did diabetic coma play any part in the fatal issue, and even here its importance was uncertain, as at the time of death the ketosis had been corrected, the blood sugar was 140 mg. per 100 ml., and the patient had a severe staphylococcal pyaemia.

A death rate of 9.3% may seem to be high, but it compares quite favourably with the figure of 6.95% which was the overall mortality rate in the 1,007 patients admitted to one of the general surgical charges in the hospital during 1949. The average age of this latter group was considerably less than that of the diabetic patients. The factors of most importance in the deaths of the diabetic patients were: (1) their age, the majority being over 70; (2) the presence of degenerative vascular disease, which was no doubt accelerated if not caused by the diabetes; and (3) the incidence of serious disorders such as gangrene and malignant disease. It is particularly striking that diabetic coma, which used to be responsible for so many deaths in the pre-insulin era, is now of minor importance. It is in fact a preventable complication.

Management

The management of the diabetes in these patients was in the hands of the medical charge which is responsible for the diabetic out-patient clinic. The sister in charge of the diet kitchen was responsible for the patients' diet, and their urine specimens were tested in the side-room of the metabolic ward to which the diet kitchen is attached. This arrangement has many advantages. In particular, control is centralized and the easy availability of out-patient records provides valuable information about the patients and their previous treatment. At all times a close friendly co-operation was maintained with the surgeon in charge of each case. It is essential that the physician and the surgeon should understand each other's intentions and difficulties, and this co-operation was the most important single factor in the successful treatment of these patients.

The aim of the medical staff was to arrange the control of the diabetes in such a way as to permit the surgeon to treat his patient as he would wish to do if no diabetes was present. In the great majority of cases this aim was achieved so long as reasonable notice of the surgical programme was received. In only one case was a planned operation postponed because of an unexpected increase in the severity of the diabetes on the morning appointed for the operation.

Pre-operative Preparation.—In most cases the operations were not emergency procedures. The time before the operation was occupied in the assessment and control of the diabetes. In most cases the normal diet was continued until the day before the operation. When patients were taking protamine-zinc insulin in doses of over 20 units the insulin treatment was rearranged so as to control the diabetes with two or three doses of soluble insulin daily for two days before the operation. When patients were taking less than 20 units of protamine-zinc insulin daily this dose was continued until the day of the operation, when soluble insulin was substituted. This arrangement was designed to avoid the risk of hypoglycaemia, which is incurred when a patient

comes to operation with a large depot of long-acting insulin. In infected cases, antibiotic treatment, usually with penicillin, was administered during the pre-operative days to minimize the infection and prevent its spread.

The Day of Operation

Opinions in the standard textbooks on this subject differ over the best method of controlling the diabetes on the day of the operation. Some workers starve the patient and give no insulin before the operation (Barach, 1949); others give protamine-zinc insulin in a reduced dose to those patients who have been accustomed to take it (Wilder, 1941; Root, 1946); yet others give a small carbohydrate feed together with a dose of soluble insulin at a suitable interval before the operation (Lawrence, 1950). In this series the latter plan was adopted; the soluble insulin was given about four hours, and the carbohydrate about three and a half hours, before the operation. The object was to send the patient to the operating theatre with a reasonably normal carbohydrate metabolism and an adequate store of glycogen in his liver. For the carbohydrate feed many clinics use a solution of glucose flavoured with orange juice. Some diabetics unaccustomed to sweet foods find this nauseating, and this minor disadvantage was obviated by the use of Benger's food with lactose in milk. This proved very satisfactory and there were no complaints of vomiting during anaesthesia. In patients who were to have gastric operations an equivalent amount of carbohydrate was given by intravenous injection of glucose.

Soluble insulin was preferred for the pre-operative dose because of the shorter duration of activity and the greater flexibility of treatment which it permits. Hypoglycaemia due to soluble insulin is more easily recognized and more rapidly corrected than that due to protamine-zinc insulin. Patients who had been controlled by diet without insulin were given a small dose, about 12 units of soluble insulin, with the pre-operative feed, to help them to weather the stress of the operation. The estimation of the correct pre-operative dose for those who require insulin for everyday treatment may be a difficult problem. It is essential to study the individual patient from all points of view rather than to attempt to work out and follow a routine. In this series the dose was usually from one-half to two-thirds of the usual morning dose of soluble insulin, reckoned on the basis of control by two daily doses of this type of insulin. On the one hand, it is important to give enough to prevent the occurrence of ketosis in the immediate post-operative period, and, on the other hand, particularly in the older patients, it is dangerous to risk the complication of hypoglycaemia, which is difficult to recognize in the anaesthetized and sedated patient.

Post-operative Period

During this period the diet was modified to suit the surgical condition. The usual practice was to give a light fluid diet on the evening of the day of the operation and then according to the following diet sheet:

First Day (Carbohydrate, 150–165 g.; calories, 1,300–1,400)

Breakfast.—Four tablespoonfuls strained porridge. Quarter-pint milk (150 ml.) from allowance. Tea with milk, if desired.

Mid-morning.—Quarter-pint (150 ml.) fruit juice plus ½ oz. (10 g.) glucose.

Lunch.—3 oz. (90 g.) puréed fruit or fruit juice as jelly. Cereal pudding made with quarter-pint milk (150 ml.) from allowance, plus ½ oz. (10 g.) cereal. Milk from allowance to drink.

Tea.—One egg, lightly boiled, poached, or scrambled. 1–1½ oz. (30–45 g.) bread with butter from allowance. Tea with milk from allowance.

Supper.—Benger's food, made with quarter-pint (150 ml.) milk from allowance plus ½ oz. (15 g.) Benger's. 1–1½ oz. (30–45 g.) bread with butter from allowance.

10 p.m.—Remainder of milk to drink.

Allowance for Day.—1½ pints (900 ml.) milk; ½ oz. (15 g.) butter. Two plain biscuits—for example "rich tea"—can be substituted for 1 oz. (30 g.) of bread.

Second Day

1 oz. (30 g.) of bread is added to breakfast.

1–1½ oz. (30–45 g.) easily digested meat, plus 1½ oz. (45 g.) mashed potato, added to lunch (carbohydrate, 175 g.; calories, 1,500).

From the third day the amount of meat, vegetable, and bread is increased daily until the diet reaches normal proportions.

In certain cases it was necessary to supply carbohydrate by intravenous infusion of glucose solutions for the first day or two after the operation, but this was restricted to patients in whom the surgeon wished to avoid oral feeding. Until a normal diet was taken soluble insulin was used and long-acting insulin was avoided. When the patient was able to take his usual food protamine-zinc insulin was recommenced.

The Anaesthetic

When ether was the standard general anaesthetic, and even more so in the days of chloroform, diabetics fared badly. The dangers of ketosis were accentuated by liver damage and the not infrequent post-operative vomiting. In consequence it was usual to recommend that spinal or regional anaesthesia should be employed if at all possible and that nitrous oxide and oxygen should be given preference, where feasible, if inhalation anaesthesia was essential. Most of the patients in this series were anaesthetized with intravenous thiopentone, and the anaesthesia was maintained with cyclopropane and oxygen. Curariform drugs were used when relaxation was especially important. A few patients had spinal anaesthetics. The results were remarkably satisfactory. Post-operative vomiting was rare and most of the patients made rapid and uncomplicated recoveries from the anaesthetic. General anaesthesia of this type is so satisfactory that there is no longer any advantage to be gained by the use of regional anaesthesia in diabetic patients.

Emergency Operations

In general the same principles were observed in emergencies as in planned operations. Sometimes there was difficulty because little information was available about the patient's previous treatment, and special problems were encountered when the diabetes was poorly controlled at the time the need for operation arose. Under these circumstances, and especially if the patient was ketotic, the operation was sometimes delayed for a few hours to allow energetic treatment with soluble insulin to effect an improvement in the control of the diabetes. In some such cases the insulin was given in part by the intravenous route for more rapid action. It was at these times that the value of close co-operation between the physician and the surgeon was greatest. When the surgeon could countenance no delay in the operation, and the patient was ketotic, the physician had to do the best he could. Large doses of soluble insulin, regulated by frequent blood-sugar estimations, and the use of intravenous infusions of normal saline proved successful in the few cases of such gravity encountered in this series.

Surgeons and anaesthetists often ask for a system that will enable them to care for diabetics in emergencies when no physician is at hand to help. From what has been said it is evident that it is impossible to devise any mathematical or rule-of-thumb method to suit all diabetics who require operation. There are so many factors to be considered, and the treatment has to be flexible so that it can be varied at short notice to meet the rapidly changing situation. When such occasions arise it seems wise that the anaesthetist should take a share of the responsibility for the diabetes, to free the surgeon for his own work. Soluble insulin should be used. It should be given in large doses (40 to 100 units) if the patient is ketotic. The doses should be regulated by blood-sugar estimations and urine tests. An intravenous infusion of saline should be used if the patient is dehydrated, and the stomach should be washed out if he has been vomiting. If the diabetes is reasonably well controlled, soluble insulin

should be given in small doses (8 to 20 units) every four hours on the basis of urine examinations. It may be necessary to give such patients 20 g. of glucose by intravenous injection with the pre-operative dose of insulin, and fluid feeds containing 20 g. of carbohydrate every four hours for the first day after the operation.

Special Difficulties

Diabetic ketosis is often complicated by symptoms which suggest the presence of an acute abdominal emergency. These symptoms usually subside as the ketosis is corrected. Two young patients in this series had unnecessary laparotomies performed on account of the occurrence of symptoms suggestive of acute appendicitis while they were ketotic. Such a situation may give rise to grave diagnostic difficulties. The patient is often rather uncooperative and there may be physical signs such as abdominal tenderness and rigidity. The presence of a leucocytosis is of no assistance, as there is nearly always a very high white blood count in diabetic coma. In such cases the history is of more value than the examination. If it is found that thirst, polyuria, and drowsiness preceded the abdominal symptoms it is likely that ketosis is responsible for the whole clinical picture, but when the symptoms appear in the reverse order it is more likely that the ketosis is the result of an acute abdominal emergency.

Conclusions

Modern developments have improved the prospect for the surgical diabetic to such an extent that the overall mortality rate in such patients is little higher than that in non-diabetics. Degenerative vascular disease is common in diabetics and gives rise to most of the serious difficulties encountered. The diabetes of a considerable number of patients admitted to surgical wards was undiagnosed before admission, and the recognition of the disorder by routine urine-testing is of paramount importance before such patients are subjected to operative treatment. General anaesthesia is now so satisfactory that there is no special need for regional anaesthesia in the diabetic patient. Full co-operation between the surgeon and a physician who is specially interested in diabetes is of the greatest importance in the successful management of surgical diabetics.

Summary

The problems of the control of diabetes in surgical patients are discussed.

Details are given of a series of 300 consecutive surgical diabetics.

The majority of the patients were over 50 years of age.

Gangrene of the foot was the most common single disorder.

Forty-one of the patients were not known to be diabetic when they were admitted to the surgical wards.

The overall mortality rate was 9.3%.

Diabetic coma was unimportant as a cause of death.

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INCIDENCE AND TYPE DISTRIBUTION OF CAPSULATED H. INFLUENZAE STRAINS

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In 1945 Straker reported on the incidence of capsulated *Haemophilus influenzae* strains in healthy children. She found that the incidence varied from 8 to 19% in the individuals examined. Little is known about the proportion in which each of the six known types of *H. influenzae*, a–f, contribute to the carrier rate in this country. Straker merely stated that some of the strains isolated from children belonged to type b, and that in 60 adults swabbed regularly for four years capsulated strains were found occasionally, but that type b was absent. Platt (1937) examined 86 nasopharyngeal strains and identified three of these as type e and one as type a. There is a certain element of doubt regarding his findings, as his typing results were obtained with purified fractions of the capsular substance, while his experiments when employing the usual precipito-agglutination technique gave confusing results. Apart from these two reports no investigations have been carried out on the incidence of the six *H. influenzae* types in this country. Ounsted (1950, 1951) suggested that *H. influenzae* meningitis in children arises from infection with type b strains, the virulence of which has been increased by several previous passages through partially immune older sibs. In view of this interesting hypothesis exact knowledge of the incidence of the *H. influenzae* types has gained an added importance.

Present Investigation

The investigation was undertaken with a view to obtaining data on the occurrence and distribution of the six *H. influenzae* types in the nasopharynx of children in the Leeds area. The recent M.R.C. inquiry into the effectiveness of different prophylactic whooping-cough vaccines provided us with a convenient source of per-nasal swabs from children with upper respiratory infections. These children were either whooping-cough suspects to be examined bacteriologically or their contacts.

Technique.—The children were seen by Dr. G. R. Baxter, who is in charge of the immunization centre at Leeds, and he took nasopharyngeal mucus by means of per-nasal swabs mounted on a flexible curved and non-corroding wire, with a view to isolating *H. pertussis*. The swabs were delivered to the laboratory with the least possible delay and were inoculated at once to Bordet-Gengou plates containing 5 units of penicillin incorporated in 15 ml. of medium. From these plates subcultures were made after three to four days' incubation at 37° C. to 10% heated blood (chocolate) agar plates, and any *H. influenzae* strains detected in this way were examined for their colonial appearance. Strains with mucoid colonies thus isolated were examined for their agglutinability by means of the slide-agglutination technique with specific type sera a-f, and, if positive with one of these sera, the Neufeld test ("capsule swelling") was carried out with the homologous and the five heterologous sera.

Results

In this way 868 swabs from 650 cases were examined during the period August 1, 1948, to December 31, 1950. Capsulated *H. influenzae* strains were found in 31 children of the ages of 0 to 4 years—that is, in 4.7%. In only one case was a typable *H. influenzae* strain isolated together with *H. pertussis*, while the simultaneous occurrence of non-capsulated *H. influenzae* and *H. pertussis* was a frequent experience. In one child aged 2½ years types b and c were present simultaneously. On the other hand two siblings aged 2 and 5 years harboured each a different type of capsulated *H. influenzae*—namely, types f and d. Apart from this pair of siblings no relationship or close contact could be established between the 31 carriers.

In Table I the type incidence and distribution of the Leeds strains are compared with the corresponding figures obtained from 847 children by Alexander (1943) in New York. The

TABLE I.—*Type Distribution of Capsulated H. influenzae Strains Isolated from the Nasopharynx of Children With and Without Upper Respiratory Infection*

	H. influenzae Type						Total
	a	b	c	d	e	f	
Leeds (1948–50) ..	2	6	1	4	8	11	32
New York (1943) ..	3	14	1	1	2	3	24

17 cases labelled by Alexander as severe have been excluded from Table I because no comparable ones are included in the Leeds series. These severe cases of Alexander's consisted of a number of conditions accompanied by bacteriaemia and also of cases of obstructive infections of the respiratory tract and meningitis, all these conditions without exception being due to *H. influenzae* type b.

While in the New York investigation *H. influenzae* type b was found nearly five times as often as any of the other types, the distribution in the Leeds area differed significantly. Type e occurred 33% more often than type b, and the number of type f strains was nearly double that of type b. After type b the next in frequency was type d, followed by type a, while type c, as in New York, was isolated once only.

During the same period of observation 10 cases of *H. influenzae* meningitis occurred in the Leeds area, and *H. influenzae* strains from 31 further cases in various parts of England and Wales were sent to this department to be typed. All 41 meningeal strains, including the 10 strains from cases in the Leeds area, were of type b.

The age groups of children examined in this series were largely determined by the original purpose of the investigation—that is, to test the effectiveness of various pertussis vaccines. It is felt, therefore, that on account of this selection, and pending more investigations on less selected patients, no conclusions should be drawn from the age distribution of capsulated *H. influenzae* strains as shown in Table II.

TABLE II.—*Distribution of Capsulated H. influenzae Strains from Nasopharynx of Children According to Type of Strain and Age Group*

Age in Years	% of Total*	*H. influenzae* Type						
		a	b	c	d	e	f	Total
Under 1 ..	6·7	0	1	0	0	0	0	1
1	46·9	2	3	0	2	7	6	20
2	27·4	0	2	1	1	0	2	6
3	7·0	0	0	0	0	0	2	2
4	5·6	0	0	0	1	1	1	3

* 6·4% of the total number of patients were either over 4 or their ages had not been supplied.

Organisms Other than H. pertussis and Capsulated H. influenzae Isolated from Penicillin/Bordet–Gengou Plates

A partial survey of the non-pertussis flora was attempted in about half the children investigated. From 370 cases 468 swabs were examined in this respect so far as the organisms were able to grow in the presence of 0.3 unit of penicillin per ml. of Bordet–Gengou medium. Table III gives the relevant figures.

TABLE III.—*Bacterial Flora Other than H. pertussis and Capsulated H. influenzae in 468 Swabs as Cultured on Bordet–Gengou Medium Containing 0.3 Unit of Penicillin per ml.*

Organism	No. of Swabs in which Present
Non-capsulated *H. influenzae*	384
H. para-influenzae	5
Neisseria, excluding *N. meningitidis*	149
B. friedländeri	8
Staph. albus and *aureus*	11
Non-haemolytic streptococci	4
Coliform bacilli	2

The predominance of non-capsulated *H. influenzae* and *Neisseria* in the nasopharyngeal flora is explained by the relative insensitivity of these organisms to the concentration of penicillin present in the medium. On the other hand, this concentration of penicillin may have eliminated different proportions of capsulated and non-capsulated *H. influenzae* strains sensitive to this concentration (Gordon and Zinnemann, 1945). These authors found non-capsulated *H. influenzae* strains to be somewhat less sensitive to penicillin than capsulated strains. For this reason figures for the relationship of capsulated to non-capsulated strains are not given, as the experimental error introduced in this way cannot be assessed.

Discussion

In the histories of cases of *H. influenzae* meningitis the most frequently found antecedents are a respiratory infection or a fall on the head (Allibone *et al.*, 1951). Conceivably, in both instances pathogenic organisms present in the nasopharyngeal flora can be responsible for the ensuing meningitis. In view of the fact that all of 10 cases of *H. influenzae* meningitis occurring during the same period in the Leeds area and 31 cases elsewhere in England and Wales were caused by type b strains, it is somewhat surprising to isolate types e and f more frequently than type b from the nasopharynx of a selected group of children. One would expect the carrier rate of *H. influenzae* type b to be appreciably higher than that of any other type. Results corresponding to these expectations were obtained by Alexander in New York in a comparable group of children during an 18 months' investigation prior to 1943. It might be argued that the discrepancy between the New York and Leeds figures can be explained by a higher sensitivity of *H. influenzae* type b strains to the concentrations of penicillin present in our Bordet–Gengou medium used for isolation. However, the data published by Hewitt and Pittman (1946) do not suggest that any significant differences exist in the penicillin sensitivities of the six *H. influenzae* types.

Two conclusions may be derived from these considerations: (1) type distribution of capsulated *H. influenzae* strains differs with the locality and period of investigation; and (2) for some as yet unknown reason type b strains are more virulent for man than any of the other five known capsulated *H. influenzae* types.

Experimental evidence to support the second suggestion is not available, although it has been found by various authors (Pittman, 1931; Chandler *et al.*, 1937; Raettig, 1939–40; Allison *et al.*, 1943) that capsulated strains are more virulent for white mice than non-capsulated *H. influenzae* strains. It is known that the capsular polysaccharides of the six *H. influenzae* types are serologically (Pittman, 1931, 1933) and chemically different (MacPherson *et al.*, 1949), and these differences might account for differences in virulence. In this context it is interesting to note that it was shown recently that the antigenic composition of the capsule of freshly isolated *H. influenzae* type e strains is more complex than had been supposed hitherto (Williamson and Zinnemann, 1951).

Whether the presence of capsulated *H. influenzae* strains in the nasopharynx causes distinct clinical symptoms is difficult to decide from this study, as many of the children in whom no pertussis and no capsulated *H. influenzae* strains were found suffered from a persistent cough. It is gener-

ally recognized that the presence of *H. influenzae* in meningitis (Rivers, 1922; Zinnemann, 1946; Allibone *et al.*, 1951), and probably also in bronchiectasis (Allison *et al.*, 1943), is responsible for the formation of a very tenacious greenish-yellow mucopus. Such pus in the nasopharynx may well produce a cough resembling a whoop.

Summary

From per-nasal swabs of 650 children aged 0–4 years 32 capsulated *H. influenzae* strains have been isolated.

Type f was found 11 times, type e 8 times, and type b 6 times, the other three types occurring less often.

The fact that the most frequently isolated types were not *H. influenzae* type b, while type b was the causative agent in all of 41 cases of *H. influenzae* meningitis occurring during the same period in Leeds and various other parts of England and Wales, suggests that this type is more virulent for man than the other five known *H. influenzae* types.

We are greatly indebted to Professor J. W. McLeod for access to the bacteriological material. We are glad to acknowledge Dr. G. C. Turner's help in providing us with *H. influenzae* strains from the whooping-cough inquiry after one of us (B. D.) had left the department.

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INFANTILE CORTICAL HYPEROSTOSIS

BY

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Although a few isolated cases of infantile cortical hyperostosis had probably been recorded previously, the first full description of the disease was given by Caffey and Silverman (1945); their report was closely followed by those of Smyth *et al.* (1946) and Caffey (1946). The disease, which affects the sexes equally, always becomes manifest before the age of 6 months (Caffey, 1950). Its three cardinal signs are excessive irritability, localized swellings in the soft tissues, and periosteal thickening of various bones. This last feature is always seen in bones underlying the swellings of soft tissues, but is often demonstrable radiologically in other bones. Fever, leucocytosis, and anaemia may also be present. The course of the disease extends over months, with unpredictable remissions and relapses, but in all cases observed by Caffey (1950) complete clinical cure has resulted.

The majority of cases have been described by North American authors. MacGregor and Davies (1949), reporting the second recorded case in this country, found 28 in the literature; they included, however, a case described by Ellis (1939) which must be regarded as not proved, while two of the cases of Caffey (1946) and two of Smyth *et al.* (1946), occurring in children over 1 year old, are more likely to be examples of hypervitaminosis A, a view now shared by Caffey himself (1950). Up to 1949, therefore, 24 proved cases had been described; since then 15 have been added, three of which are in the British literature (Astley, 1950; Sakula, 1950; and Smitham and Palmer, 1950). Although the disease is probably not as uncommon in this country as would appear, its true incidence can be judged only if recognized cases are reported. It is of importance also to determine the mortality rate accurately, since the disease is not invariably as benign as in Caffey's series. Two cases have been described (van Zeben, 1948; Mossberger, 1950), in which the patient died of secondary infection, as did one of the two reported here.

Case 1

A female infant aged 15 weeks was first seen by one of us (W. J. M.) on July 28, 1950, because of fever and swelling of the face. The baby, an only child, was born at term after an uneventful pregnancy and normal delivery, and weighed 7¼ lb. (3.3 kg.). She was bottle-fed and had been given cod-liver oil but not orange juice. The mother and father were both healthy. She had been well until a week previously, since when she had been feverish and fretful, although she had taken feeds well. On the previous day the right side of the face had been noticed to be swollen.

On examination her rectal temperature was 99.4° F. (37.5° C.) and pulse 166. Her weight was 14 lb. (6.4 kg.). She did not seem to be acutely ill and no abnormality other than the facial swelling was found. This was present over the whole length of the right mandible and appeared to be part of the bone itself. It was not tender and the skin was unaffected.

A provisional diagnosis of infantile cortical hyperostosis was made, skiagrams were taken, and the mother was asked to bring the child back in three days. Next day, however, she became alarmed at the condition of the baby, who, at her doctor's request, was admitted to hospital.

On admission the physical findings were essentially unchanged. There was a persistent pyrexia at 100–101° F. (37.8–38.4° C.). Eight days after admission she developed

FIG. 1.—Case 1. Periosteal thickening of the mandible.

diarrhoea and vomiting, which failed to respond to supportive therapy, and she died five days later.

Investigations.—Skiagrams showed periosteal thickening of both mandibles, especially on the right side (Fig. 1). No other bone was involved. A blood count on August 2 showed: Hb, 60% ; white cells, 22,700 (polymorphs 16,570) ; and on August 8: Hb, 64% ; white cells, 14,300 (polymorphs 5,434). Wassermann and Kahn reactions were both negative.

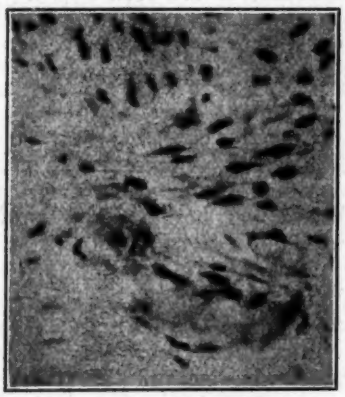

FIG. 2.—Case 1. Mandible, showing numerous osteoblasts in periosteum. H. and E. (×400.)

At necropsy abnormal findings were confined to the mandible and the liver. The *mandible* showed along its whole length thickening of the periosteum, which could be stripped easily from the bone. Microscopically (Fig. 2) the periosteum was considerably thickened and very cellular, with numerous osteoblasts forming new bone of immature form with imperfectly developed Haversian systems. There was no evidence of inflammation or of trauma. The *liver* showed fatty infiltration.

Case 2

This patient, a male infant, was first seen by one of us (W. J. M.) on February 9, 1951, at the age of 4 months, because of swelling of the jaw. He was a full-term baby born to healthy parents after a normal pregnancy and delivery, weighing 6¼ lb. (2.8 kg.). He was bottle-fed and had received vitamin supplements in adequate amounts. He was well until a month old, when swellings appeared over the lower jaw on each side ; he became irritable, and refused to take full feeds. After about six weeks the facial swelling had subsided, but it recurred two weeks later and persisted. His appetite had gradually improved and was now normal. At no time had he been noticeably febrile.

On examination his temperature, pulse, and respirations were normal ; weight 11¼ lb. (5.1 kg.). The only abnormal findings on clinical examination were swellings overlying both mandibles and numerous small shotty glands in both posterior triangles of the neck. The swellings, which were hard and not tender, involved the whole length of the mandible and appeared to be part of the bone itself (Fig. 3). The overlying soft tissues did not seem to be involved.

FIG. 3.—Case 2. Showing swelling of lower jaw.

X-ray examination showed periosteal thickening involving both mandibles, both tibiae, and the left femur (Fig. 4). The Wassermann and Kahn reactions were both negative.

Progress.—The baby has been seen at intervals and has remained in good general health. He was last seen on August 24, when he was 10 months old and weighed 22 lb. (10 kg.). There was then still visible swelling of the right lower jaw, although this was less marked than it was originally. Skiagrams still showed periosteal thickening, which was fusing with the cortex.

FIG. 4.—Case 2. Periosteal thickening of left femur.

Discussion

These two cases show two of the three salient features of infantile cortical hyperostosis—namely, irritability and "cortical" thickening of bone. Neither showed swelling of the soft tissues. According to Caffey (1950) these appear long before there is any radiological evidence of bony involvement and disappear a considerable time before the bony changes. This would explain their absence in Case 2, which was not seen until three months after the onset of symptoms. In Case 1 it must be presumed that, the baby being fat, the facial swellings had passed unnoticed, since *x*-ray changes in the mandible were already evident when she was first seen, although the history was of only a week's illness.

Biopsies of the affected soft tissues have shown (Sherman, 1949 ; Sherman and Hellyer, 1950) necrosis and fibrosis of muscle with intimal proliferation in the blood vessels. Such intimal proliferation has also been found in the vessels of the periosteum, and this must lead to a diminution in the blood supply to the bone. It is known (Illingworth and Dick, 1949) that, while total deprivation of blood supply leads to necrosis of bone, diminution stimulates new bone formation, a process exemplified in the sabre tibia of congenital syphilis. Infantile cortical hyperostosis has been regarded as primarily a disease of bone, but the appearance of subcutaneous swellings as the initial manifestation and the microscopical evidence of changes in the blood vessels suggest that these are the primary disturbances and are responsible for the bony changes.

The term "infantile *cortical* hyperostosis" is a misnomer, since microscopical examination shows that it is in fact the periosteum which is thickened. Numerous fibroblasts appear in the periosteum, which is lifted off the bone ; subperiosteal new bone is then formed, produces the bony swellings which may be palpable, and subsequently fuses with the cortex.

According to Sherman and Hellyer (1950) the only bones never reported to be involved are the phalanges, the small bones of the tarsus and carpus, the vertebrae, and the pelvis, but Sakula (1950) has described a case in which the pelvis was affected. Of all the bones, however, the mandible, clavicle, and ulna are most commonly involved (Caffey, 1950). When the mandible is involved, as in the present two cases, the child's appearance is characteristic enough for the disease to be suspected on sight.

The fever and leucocytosis which are commonly found point to an infection as the cause of the disease, and the peculiar age incidence suggests a prenatal origin. No micro-organism, however, has been recovered from affected tissues, although attempts have been made (van Zeben, 1948 ; Sherman and Hellyer, 1950), and the microscopical appear-

ance shows no evidence of infection (Fig. 2). Moreover, there was no evidence in the present two cases of maternal infection during pregnancy.

A prominent feature of this condition is extreme irritability, which may be due to pain in the bones; from observation of Case 1 it was thought that the child suffered from pain in the affected jaw. It is possible that, when the part becomes warm, pain is produced by vascular dilatation compressing the nerves in Haversian canals narrowed by new bone formation. This explanation is supported by Mossberger's (1950) finding of newly formed cancellous bone filling the Haversian spaces. The long course and marked irritability suggest an analogy with pink disease. It is notorious that cases of the latter are prone to secondary infection, and, to judge from reported cases, there seems to be a similar tendency in infantile cortical hyperostosis. One of our patients died in hospital of secondary infection, as did one of van Zeben's (1948). Mossberger's patient (1950) died suddenly at home, and necropsy indicated that an infection in the gut was the cause of death. Since three of the 41 recorded cases have ended fatally, this disease cannot be considered as benign as has been thought, and it would be sound practice to exclude these cases from hospital unless their admission was strongly indicated.

Summary

Two cases of infantile cortical hyperostosis are described; in one of these the patient died of secondary infection, to which these cases appear to be prone. The disease is therefore not invariably benign, and it would be prudent to avoid admission to hospital.

It is suggested that the bony changes are dependent on diminution in the blood supply to the bone due to intimal thickening, and that the disease is not primarily one of bone.

We wish to thank Dr. J. V. C. Braithwaite for the hospital notes of Case 1, which was admitted under his care, Dr. M. Bodian for the histological report, Dr. D. Forbes Lawson for the skiagrams, Mr. R. W. T. Gaze for the photomicrographs, and Drs. C. K. McCoan and T. M. Gibson for referring the patients to us.

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At the first annual general meeting of the Edinburgh Group of the Infantile Paralysis Fellowship the secretary gave a short outline of the history and work of the group (*Scotsman*, March 14). It is already acting as an information centre and has contacts with the Ministry of Labour and with the Edinburgh Council of Social Services. It has also offered to finance members who wish to take a degree by postal course. Priority at cinemas for members means that they do not have to wait in queues. Another project is a plan to supply television sets to patients in iron lungs. Also the group has managed to get increased supplies of steel needed for orthopaedic appliances.

OUTBREAK OF BORNHOLM DISEASE IN WEST FIFE PRACTICE

BY

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AND

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Quite a considerable amount of literature on the subject of Bornholm disease has accumulated within the past 20 years. The disease has now become more generally recognized as a definite entity.

The attention of one of us (W. W. W. McN.) was drawn to the symptomatology of the illness by Hopkins (1950), who described cases which had occurred in his practice. Similar cases had occurred from time to time in the practice here, but had gone unrecognized as Bornholm disease. In May, 1951, the appearance of the cases of two boys proved in retrospect to be the beginning of an outbreak, which continued during June and July. During that time 24 cases from a scattered community came under our care.

Bornholm disease, as we now know it, seems to be an infection of the diaphragm. Ronald (1942) made out a good case for this assumption and thought that the infection occurred primarily in the diaphragmatic muscle, but suggested it might also be primarily in the diaphragmatic pleura. Hopkins believed that when pleurisy did occur it was an extension of the disease from the muscle. The Coxsackie group of viruses is considered by Findlay and Howard (1950) to be the infecting agent.

The cases were investigated from the general practitioner's point of view. The first cases were seen at the end of May and the last on July 30. The outbreak was, therefore, almost exclusively confined to the months of June and July. Four patients were under 10 years of age, six were 10–19, seven 20–29, five 30–39, and two were 40 and over. There were seventeen males and seven females.

Symptoms and Signs

In almost every case the onset was sudden, pain in the upper abdomen or lower thorax being the outstanding feature. The site of pain and the frequency of occurrence are shown in Table I. The pain was definitely related

TABLE I.—*Site and Frequency of Pain*

Abdominal	20
Right upper subcostal	7
Bilateral subcostal	3
Vague upper	4
Central epigastric radiating to either side	3
Epigastric, spreading to lower left chest	3
Thoracic	4
Left lower anterior	2
Bilateral lower posterior	1
Right lower posterior	1

to respiration in most of the cases. In 20 it was much worse on breathing. Some complained that it was like a stitch in the side; others gasped on account of its severity and were afraid to breathe. Various adjectives were used to describe it: knife-like, terrible, sharp, shooting, unbearable. Some who initially had pain in the upper abdomen had pain in the lower thorax, on one or other side, within a few days. Others had transient pains in the lower thorax before the onset of the acute crippling pain in the abdomen. One patient had pain radiating into the right iliac fossa, which made him think he had appendicitis; another com-

plained of pain in the back of the neck as well as subcostal pain. Movement of the trunk and walking increased the pain in several cases. The pain was accompanied by sickness and vomiting in only two cases, and only one complained of constipation. Four patients had sore throat and nine had headache. All but three had a rise in temperature, the range being from 99 to 102° F. (37.2 to 38.9° C.).

Upper abdominal tenderness was present in nine, being in the right subcostal region in five. One patient had pain at the right shoulder-tip on deep palpation in the right hypochondrium. Tenderness over the lower thorax was noted in one case. Apart from these signs no other abnormality was noted on abdominal examination.

Examination of the chest at the onset of the illness revealed no definite abnormality except restricted breathing and occasionally inverse breathing. In five cases pleural friction was noted four to ten days after the onset (Table II). One patient

TABLE II.—*Cases with Pleural Friction*

Age in Years	Sex	Situation	Time from Onset of Symptoms	Duration
16	M	Left base anteriorly	8 days	Less than 7 days
26	F	Right ,, ,,	9 ,,	10 days
34	M	,, ,, ,,	9 ,,	3–6 ,,
35	F	Left ,, ,,	4 ,,	
		Right base posteriorly	7 ,,	14 ,,
35	M	Left base anteriorly		
		,, ,, posteriorly	10 ,,	21 ,,

was entirely free from symptoms before the development of the pleural rub; another stated that she felt the rub. The symptoms usually subsided in a few days, most patients being fairly well within a week. Some took up to two weeks, and a few who developed pleural friction took longer.

Typical Cases

A girl aged 10 was brought to the surgery on the evening of June 21. She had complained of abdominal pain when home for lunch. After returning to school the pain got worse and she had to be sent home. Her main complaint was of severe pain across the upper abdomen, worse in the right costal region. The pain was excruciating whenever she took a deep breath. She also had a headache. Her temperature was 101° F. (38.3° C.) and there was marked tenderness in the right hypochondrium. She had no sickness or vomiting. There were no definite abnormal clinical signs in her chest. We thought she was in for pneumonia and sent her home to bed. Next day her temperature was normal; she was breathing quite freely and had no pain. The tenderness in the right hypochondrium had gone. A day later she was feeling so well that she was allowed up and in two days she was allowed out.

On June 22, when visiting this girl, we were asked to see her younger brother, aged 8. He complained of pain in the lower left chest anteriorly which was catching his breath. There was a slight rise of temperature to 99° F. (37.2° C.). No abnormal clinical signs could be detected in his chest. Next day he was feeling quite well again. The pain had gone and he was allowed up.

These two cases were direct contacts of two others which occurred in the same block of houses and probably of another one.

Observations on the Outbreak

Differential Diagnosis.—Pneumonia was excluded by the absence of abnormal clinical signs in the chest, and by the subsequent course of the illness. Pleurisy (tuberculous): all cases with pleural friction were *x*-rayed and declared negative. Abdominal conditions were ruled out by the absence of typical signs and symptoms, and by the fact that the pain in most cases was related to breathing.

When first seen more than half the cases were given "sulphatriad" until the possibility of pneumonia was ruled out. On the non-appearance of definite signs the drug was usually discontinued after a very short course. Otherwise treatment was symptomatic. No complications were noted.

There were five families in which two members were affected. Contact could also be traced between another pair and probably between two others. No definite conclusions could be reached on the incubation period, but it was possibly between four and six days. When reviewed in October, five of the patients stated that pain lasting one day recurred two weeks after their first attack.

Pleural Friction.—The onset of pleural friction rub four to ten days after the onset of symptoms is noteworthy, as also is the age group—16–35 years. The incidence of pleural rub was almost one in five. Scadding (1946) reported cases which he called "acute benign dry pleurisy." Eleven out of his 20 cases had pleural friction. Finn, Weller, and Morgan (1949) reported 28 cases with pleural friction in their series of 114 cases.

Summary

The main features of an outbreak of 24 cases of Bornholm disease are described.

Observations are made on certain of the features, especially the occurrence of pleural friction rub.

We are grateful to Drs. P. Aitken and J. Rubin, radiologists at Dunfermline and West Fife Hospital, for their *x*-ray reports.

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Medical Memorandum

Pneumatic Rupture of the Colon

As pneumatic rupture of the colon has rarely been reported in British medical literature the case here described is of interest.

CASE REPORT

A lad aged 16½, employed as an apprentice fitter at an engineering works, was admitted to hospital on October 20, 1949. He complained of difficulty in breathing and of abdominal pain. His story was that while at work, about an hour before admission, two of his workmates had placed the nozzle of a compressed-air pipe between his legs and turned on the air. He said that he had felt suddenly blown up and had found that he could breathe only with difficulty. He had some pain in the lower abdomen but had not vomited.

Examination showed a pale, shocked boy. His lips were cyanosed and he was extremely dyspnoeic, with marked movement of his alae nasi. The respirations were shallow and grunting in type. The abdomen was very distended and tympanitic, with tenderness on deep pressure and absence of peristaltic sounds. An interesting feature of the abdomen was a curious reddish-blue mottling on the abdominal wall, particularly in the flanks. The blood pressure was 150/72. There was no evidence of any surgical emphysema. On rectal examination nothing abnormal was felt, but withdrawal of the finger was followed by a profuse discharge of blood-stained faecal-smelling fluid. A diagnosis of pneumatic rupture of the colon was made. A Ryle's tube was passed and the patient was prepared for operation.

Under general anaesthesia, the abdomen was opened through a left paramedian incision. This was easily done,

as the tissues were so stretched and attenuated that they fell apart as each layer was incised. A small opening was made in the peritoneum, air whistled out, the abdomen collapsed like a pricked balloon, and his breathing improved considerably. Examination of the peritoneal cavity showed no free fluid and no gross faecal contamination. The upper end of the pelvic colon had ruptured, and in the hole was a plug of solid faeces. The pelvic mesocolon and retroperitoneal tissues were much infiltrated with blood and there was a little blood in the pelvis. Closer examination of the pelvic colon and rectum showed tears in the serous and muscular coats on the antimesenteric border of the bowel. They started at the peritoneal reflection from the upper part of the rectum, where they were small, and increased in size as the bowel was traced proximally until the point of rupture was reached. Thereafter the bowel was normal. The affected area of bowel was quite viable, and active pulsation was seen in the vessels throughout the operation.

The hole in the pelvic colon was closed in two layers with No. 60 thread and the tears in the serous and muscular coats were sutured. As the damage to the pelvic colon and upper third of rectum was so extensive a transverse colostomy was performed and opened at the end of the operation. The abdomen was closed round a sump drain inserted into the pelvis.

His post-operative condition was fair, with a blood pressure of 100/70. He was transfused with 1 pint (570 ml.) of blood, and a Wangensteen continuous-suction apparatus was attached to the sump drain. A course of 250,000 units of crystalline penicillin twice daily was started. Next day his general condition was much improved. The abdomen was soft in all areas and not distended. Two ounces (57 ml.) of blood-stained fluid had been drawn from the sump drain and 5 oz. had been aspirated from the Ryle's tube. Thereafter he continued to make steady progress. The sump drain was removed on the second day and the Ryle's tube on the fourth. On November 12 the transverse colostomy was closed, and five days later his bowels were open in the normal way. He was discharged from hospital on November 23.

He was readmitted on January 2, 1950, to ascertain if any alteration in the colon could be found on *x*-ray examination. A barium enema showed that the barium flowed to the caecum and through into the terminal ileum. The whole colon showed some loss of tone in that it dilated during filling and was only partly evacuated afterwards. His general condition was good and he had no bowel symptoms.

COMMENT

The first case of pneumatic rupture of the colon, reported by Stone (1904), is the only case recorded in the British medical literature; thereafter all the reported cases occurred in America or on the Continent.

The condition is not common despite the prevalent use of compressed air in modern industry. When it does occur it presents a familiar history and a classical picture.

Investigation at engineering works revealed that, while managers and supervisors were familiar with the possibility of such an injury occurring in those working with or near compressed air, no one was found who had seen a case. Inquiries at the City of Manchester Coroner's Court showed that no deaths from such a cause had been reported in the past 14 years. There had, however, been one death from rupture of the oesophagus following a blast of compressed air in the face.

The history invariably indicates that the injury is the result of a prank, and in scarcely any case has maliciousness been admitted. Hays (1926) states that the injury has never been self-inflicted. The prank consists in applying the nozzle of a compressed-air pipe to the area of the patient's buttocks. The important point is that the nozzle does not need to touch the skin or even to touch the clothes. In the present case this aspect of the history is well illustrated, because the boy was leaning over a balcony watching his colleagues at work beneath him. A younger apprentice, standing behind him, held the end of a compressed-air pipe about 18 in. (46 cm.) from the patient's clothes, while another turned on the air. The pressure of the air in this case was about 140 lb. per sq. in. (9.8 kg. per cm.^{2}). After his admission to hospital it was found that his trousers and dungarees were quite intact and showed no evidence of having been damaged by the passage of compressed air.

The first reaction of the patient was that he had been blown up and then that he had difficulty in breathing. Abdominal pains were not a marked feature at this stage, and this, too, is characteristic of early cases.

Andrews's (1911) explanation of what occurs is probably correct. He postulated that air at 50 to 125 lb. per sq. in. (3.5 to 8.8 kg. per cm.^{2}) forms a column which acts like a solid body, forcing open the anal sphincter. In addition the anatomical configuration of the perineum is such as to facilitate the concentration of air pressure at the anal orifice. Once the air has entered the bowel it produces tears in the muscular and serous coats and then perforation of the entire wall. He has shown that, under experimental conditions, the normal intestine will be ruptured by a pressure of 7 to 12½ lb. per sq. in. (0.49 to 0.88 kg. per cm.^{2}). Brown and Dwinelle (1942) reviewed 32 cases with 37 perforations. They found that perforation occurred most commonly at the recto-sigmoid angle and less often at some other flexure of the colon. Of their 32 cases, 29 had single perforations, two each had three perforations of the sigmoid colon, and one case had two perforations. Block and Weissman (1926) state that the anal canal and rectum escape injury because of their outside support.

The case here described illustrates these observations admirably. The tears in the serous and muscular coats increased in size as the bowel was traced proximally. This appeared to indicate that the effect of the air pressure increased until it ruptured the bowel and then spent its force on distending the peritoneal cavity.

Hays (1926), reporting one case, thought that the striking feature was the great amount of free air in the peritoneal cavity. He, too, found tearing of the serous and muscular coats in addition to perforation of the colon.

The diagnosis should be made if a history of working with compressed air is given. The tense, distended, tympanitic abdomen, the respiratory distress, and the absence of inflammatory signs together make a characteristic picture which is diagnostic of the condition. In doubtful cases, Brown and Dwinelle (1942) recommend *x*-ray examination of the abdomen in the erect position, to demonstrate air between the liver and the diaphragm.

The prognosis is generally considered to be grave. Block and Weissman (1926), reporting one case and reviewing 26 others, found a 70.3% mortality. In 12 of these cases which were not operated on, the mortality was 75%. The mortality of cases operated on was 47%. This was, however, before the advent of penicillin and the sulphonamides.

Treatment consists in immediate laparotomy with repair of the bowel. If the damage to the bowel is severe or the blood supply is doubtful, a transverse colostomy should be done. Drainage of the pelvis is advisable if there has been gross faecal contamination or if operation is not carried out within a few hours of injury.

I am indebted to the late Mr. P. G. McEvedy, under whose care this case was admitted, and to Mr. G. O. Jelly for their advice and criticism in the preparation of this report.

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Reviews

TUBERCULOSIS

Modern Practice in Tuberculosis. Edited by T. Holmes Sellors, M.A., D.M., M.Ch., F.R.C.S., and J. L. Livingstone, M.D., F.R.C.P. (In two volumes. Vol. 1, Pp. 355; 104 illustrations, 1 coloured plate; Vol. 2, Pp. 441, 159 illustrations, 2 coloured plates. £7 7s.) London: Butterworth and Co. (Publishers) Ltd. 1952.

The editors wish to make it clear that this is not a comprehensive textbook but a series of selected sections or chapters, each written by an expert in his or her branch. With the way thus cleared the 39 authors range over a wide field, which includes morbidity and mortality statistics, laboratory methods of examination, the administration of a chest clinic, rehabilitation, tuberculosis colonies, and chest radiology. In the second volume attention is paid to the more clinical aspects of the disease, and there are sections on the various aspects of non-pulmonary tuberculosis. We find here interpolated an excellent article on sarcoidosis, but why a disease of unknown aetiology is included in a book on tuberculosis is not explained.

In a brief review it is not possible to do justice to the merit of each section, but if asked to select one or two of outstanding value I should choose, on the surgical side, the section on excision of lung, which is written with the clarity of the skilled teacher, and on the medical side the dissertation on B.C.G. vaccination.

Reductions of *x*-ray films, reproduced in book form, are notoriously unsatisfactory, since they fail to show the necessary detail. In Volume 2, 146 pages, or one-third of the volume, are given up to *x*-ray film reductions. Further, some of these are of such quality that they appear to illustrate Dr. Simon's remark in his chapter on radiology, in which he deprecates the production of "grey and contrastless" films. Most readers of this book will be familiar with the *x*-ray appearances of the chest in pulmonary tuberculosis and will weary of turning over page after page of *x*-ray reductions. The binding of the volumes sent for review does not appear to be adequate, as four of the pages were already completely adrift and others showed unmistakable evidence of shortly attaining their freedom.

These two volumes will form an admirable companion to the standard textbooks on tuberculosis, and their value is enhanced by the inclusion of articles on the non-pulmonary varieties of the disease.

G. E. BEAUMONT.

CYTOLOGY

Cytology and Cell Physiology. Edited by Geoffrey H. Bourne. Second edition. (Pp. 524; illustrated. £2 10s.) Oxford: Clarendon Press. 1951.

Elements of Bacterial Cytology. By Professor Georges Knaysi. Second edition. (Pp. 375; illustrated. £2.) New York: Comstock Publishing Company, Inc. London: Constable and Co. 1951.

Cytology and Cell Physiology is a revision of the work published by 11 collaborators in 1942. It might be more exactly described with a revised title as a "Symposium on current problems of physical, chemical, and physiological technique in the study of cells as components of animal tissues." The book is concerned not so much with the more important facts we know as with the less important facts we are not sure about. And, since it went to the press four years ago, the doubtful fringe of supposition has shifted. The Golgi bodies occupy a central position in the book and enjoy a whole column of references in the index. They might now be thought less important than the chromosomes. The editor illustrates his Golgiology with what appear to be 30 photographs, 10 of them retouched, and 100 other figures. But he has to conclude with an "addendum" in small type to the effect that some well-qualified people do not believe that the Golgi apparatus really exists. Golgiogenesis having given rise to Golgio-cyto-architecture (to use the recommended terms) dissolves at last in a grateful Golgiolysis.

It is to be regretted that this kind of lucubration should be bound in the same volume with competent accounts of serious matters such as microscopy, tissue culture, and enzyme systems. It is also to be regretted that the working of the cell as a whole, which has been revealed during the last 20 years by genetic experiment and chromosome and nuclear studies, should be scarcely hinted at. The task of uniting biochemistry and cytology, to which Professor Peters devotes a very sensible foreword, demands a knowledge and coherence that is lacking in this book.

Dr. Knaysi's work is, like the symposium, concerned with technique rather than theory. Indeed, that is no doubt what he means by "bacterial cytology" as opposed to "bacteriology." Further, when he explains that, in his book, "controversial views are fairly presented, discussed and evaluated, not so much on the plausibility of a view in the author's opinion as on the merit of the evidence presented . . ." no doubt again he wishes to say that technique means more to him than theory. Hitherto this view has carried bacteriology a long way. But its present stage is still only to be compared with that of non-bacterial cytology some 60 years ago. At just such a moment a few words of theory would not be out of place. We should like to know the author's own opinion on certain general questions, on what the bacteria are, and why; how their bodies are composed, and how related to their functions; whether anything is known of their breeding habits and genetic properties which may be related to their forms. The author, however, proceeds with bacteria like his English brethren in their larger field, and on the third page he is already broaching the electron microscope. He illustrates his text with a great number of electron photographs. Fewer photographs, better described, with numbering and magnifications, would indeed be more successful. Economy is troublesome to an author, but it saves the reader time as well as expense. The book is therefore inevitably cytology for the cytologist. As such, its electron photographs undoubtedly prepare the way for great advances in the study of bacteria.

C. D. DARLINGTON.

OCULAR SURGERY

Surgery of the Oblique Muscles of the Eye. By Walter H. Fink, M.D. (Pp. 350; 93 illustrations, including 18 in colour. £3 3s.) London: Henry Kimpton. 1951.

It is only recently that extensive surgical measures of correction have been performed on the oblique muscles of the eye. It has long been known that many cases of ocular deviation and squint are due to irregular action or an upset in the balance of these muscles, but hitherto, apart from the simple technical procedure of myectomy of the inferior oblique muscle, the correction of these deformities has generally been carried out indirectly by a surgical attack on the rectus muscles. This procedure is by no means ideal, since it necessitates alleviating the worst effects of one deformity by crippling a normal muscle. The reason for this hesitancy has been the difficulty in obtaining a clear surgical approach to the insertions of the oblique muscles into the posterior aspect of the globe—and knowledge of the anatomy of this region has hitherto been somewhat vague—and the technical difficulties of undertaking delicate surgical procedures in a field so difficult of access. It is true that pioneers such as the late John Wheeler, of New York, had two decades ago successfully overcome many of the difficulties, but to-day the average surgeon is just beginning to tackle the problem.

In this volume Dr. W. H. Fink has performed a useful service by gathering together the known facts of the anatomy and physiology of the oblique muscles, their congenital aberrations (which are common), the clinical occurrence

and diagnosis of aberrations in their activities, the indications for operative interference, and the techniques which have now become to some extent standardized by practice. Although largely a compilation of the experience of others, the collection of these facts will serve to focus attention on what is still a somewhat neglected field of ophthalmic surgery. And, for good measure, the reader's interest is further enhanced by a full summary of the known facts of the embryology, comparative anatomy, and histology of the muscles concerned. A useful final chapter is on the relation of the oblique muscles to the operation for retinal detachment when, as sometimes happens, this must be undertaken on the posterior aspect of the eye.

STEWART DUKE-ELDER.

TEXTBOOK OF MEDICINE

A Textbook of Medicine. Edited by Russell L. Cecil, M.D., Sc.D., and Robert F. Loeb, M.D. Associate Editors, A. B. Gutman, M.D., W. McDermott, M.D., and H. G. Wolff, M.D. Eighth edition. (Pp. 1,627; illustrated. £3.) Philadelphia and London: W. B. Saunders Company. 1951.

This is an admirable textbook of medicine, and I do not know any other which is so comprehensive, up to date, easy to read, and yet academic in the best sense. It must be confessed that at first sight it is a formidable volume. There are 168 contributors, 1,550 pages of text, and an index of over 70 pages of small print. The book is sparingly but adequately illustrated and there are short bibliographies to each section. All this suggests an encylopaedia rather than a textbook, but it seems to be the inevitable consequence of the development of knowledge of medicine, and the editors report with pride that it is 136 pages shorter than the previous editions.

Their aim has been to emphasize the physiological, biochemical, and psychological aspects of disease. Disorders of metabolism and endocrine diseases, subjects in which the U.S.A. has led the way, are particularly well presented. These fields have been perhaps almost too deeply tilled. A list of twelve different laboratory tests for Addison's disease smacks of millionaire medicine and will dismay those in Britain who are trying to diminish useless laboratory investigation. The two-page article on haemochromatosis, on the other hand, is a fascinating account of modern views of this disease. Diseases of the nervous system, in which there have been no comparable advances, are not described with the brilliance of British writers, and the section seems to be badly organized. In parenthesis I may add that ophthalmoplegia interna is one of the few subjects for an account of which I have looked in vain. Tuberculosis is particularly well described, but there is some duplication and difference of opinion over thrombocytopenic purpura and allied states in which splenectomy is sometimes advisable. In conclusion, we must offer sincere congratulations to Drs. Cecil and Loeb on the production of this fine textbook, and at the same time warn writers on this side of the Atlantic that they will have to look to their laurels.

L. J. WITTS.

ATLAS OF HISTOLOGY

Atlas of Histologic Diagnosis in Surgical Pathology. By Karl T. Neubuerger, M.D., with a section on Exfoliative Cytology by Walter T. Wikle, B.S., M.S., M.D. Photography by Glenn E. Mills, B.A., M.A. (Pp. 460; 880 figures. £4 4s.) London: Baillière, Tindall and Cox. 1951.

This atlas contains 838 photomicrographs in black-and-white covering a considerable part of the wide field of surgical histology. It is clearly intended for those who have undertaken the responsibility of the histological diagnosis of surgical material and for others who are being trained to this end. There is no text as such, but each photomicrograph carries a terse, well-written descriptive legend. The reader is provided with a list of textbooks and monographs, but there are no references to the literature of the subject. Most of the material was taken from the surgical accessions of the Colorado General Hospital.

This is obviously not a book to read away from the laboratory. It has been compiled and arranged as a bench book for use during the actual examination of histological preparations, and for this reason its success or failure depends entirely on the quality of the photomicrographs. While a moderate number of these are good enough for comparison with the actual section, far too many fail to reach this standard. They are either photographically imperfect because of faulty light centring, or show the usual stigmata of faulty histological technique. In some of them the definition is so poor that one must assume that the sections were uncommonly thick. In others, especially those illustrating the histology of lymph glands, the material from which they were prepared has suffered from delayed fixation, or nuclear differentiation is incomplete. It is a pity that the low-power magnifications of from 40 to 80 diameters suffer most from these faults.

A separate section by Dr. Walter T. Wikle on exfoliative cytology will be of considerable interest to pathologists in Britain, where this method of tumour diagnosis is not so widely used as in the U.S.A. There are 41 high-power photomicrographs in this contribution. The author is at pains to point out that his account does no more than illustrate the general principles on which the diagnostic cytology of tumours is based, and he makes it quite clear that this discipline demands a rather lengthy period of special training, likely to cover a period at least as long as that required to train a competent haematologist—or possibly, as the subject develops, a good deal longer.

GEOFFREY HADFIELD.

MODERN ENDOCRINOLOGY

Diseases of the Endocrine Glands. By Louis J. Soffer, M.D., F.A.C.P. (Pp. 1,142; 88 illustrations and 3 coloured plates. £5 5s.) London: Henry Kimpton. 1951.

Dr. L. J. Soffer, who is assistant clinical professor of medicine at Columbia University and a well-known authority on the adrenal gland, has here tackled the whole field of endocrinology with the exception of carbohydrate metabolism (written by Henry Dolger) and the gonads (A. R. Sohval), and has succeeded in producing an informative, practical, and scientific textbook. Each chapter is preceded by a relatively short account of embryology, anatomy, histology, and physiology. Unfortunately, such is the growth rate of endocrinology that the text spreads over 1,139 pages. The references are very full and the illustrations clear and sometimes coloured, all of which brings the price for English readers to the rather high level of five guineas.

The pituitary section is conventional and adequate, and a critical assessment of the differential diagnosis of Fröhlich's syndrome (a rarity) shows expected clinical acumen and wide experience. The adrenal section is most comprehensively treated, and the author discusses many aspects of cortisone and A.C.T.H. with full knowledge of recent advances. He gives a clear analysis of Addison's disease and the relationship of the adrenals to hypo- and hyperglycaemia. In the section on adrenal hyperfunction the breadth of the author's survey is shown by apposite reference to the case of a tumour of the suprarenal gland in an infant of 18 weeks described by Reginald Lightwood in 1932, and the isolation of $\triangle$3,5-androstadiene-17-one from the urine of a man with malignant tumour of the adrenal cortex by Burrows, Cooke, Rowe, and Warren in 1937. The section on the thyroid contains a critical review of the use of radioactive iodine in diagnosis and therapy, and that on the parathyroids shows close contact with the work of Fuller Albright and Snapper. The sections on the gonads and pancreas by colleagues of the author maintain the same high standard, and the reviewer has rarely experienced such a pleasurable task as reading this excellent modern book on the rapidly advancing science of endocrinology.

S. LEONARD SIMPSON.

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MONEY AND MEDICINE

What with Dr. Ffrangcon Roberts's cool and objective analysis of the cost of health,[1] Mr. Bevan's political rodomontade, Mr. Justice Danckwerts's award, and debates in both Houses of Parliament, medicine and money—those uneasy binovular twins—are to the fore in the public and professional mind. Mr. Bevan, having remarked in his book, out this week, that "the injection of several million pounds here [i.e., in general practice] would refresh the Service at its most vulnerable point; that is, the family doctor relationship," bursts out in the House of Commons that the Danckwerts award "has shocked the majority of people in Great Britain." He claims that the award puts the Budget outside the control of Parliament, and adds this threat[2]: "The only way in which we can hope to get the finances of the nation under proper control is by always reserving the right of the Government to refuse to accept any recommendation made by an outside body." Mr. Bevan tags this on to a discussion on *compulsory* arbitration. But there has been no compulsion. The adjudication was entered into by *voluntary* agreement between the B.M.A. and the late Government, of which Mr. Bevan was an intermittent member; and both sides agreed in advance to accept the decision of the adjudicator. Not only that, but Mr. Bevan as Minister of Health accepted the Spens report on the remuneration of general practitioners. Mr. Justice Danckwerts has done no more and no less than fill out the recommendations of that report. It must be emphasized that the award is not an increase in the remuneration of general practitioners but a settlement—nearly four years overdue—of what the remuneration should have been in 1948 and subsequently. The trouble with Mr. Bevan is that he seems to regard the N.H.S. Acts as his own private possession, and something to be interpreted, or misinterpreted, by himself alone. His "pattern of behaviour" is only too painfully obvious. And so it is with the proposed shilling tax on prescriptions. The G.M.S. Committee has made its protest against this, principally on the grounds that the dispensing practitioner must on no account be made a tax-collector for the Government. Outside this undesirable feature the shilling tax is, as so many have pointed out, politics. And that political adept, Mr. Bevan, confessed again last week that he had been attacked by his friends on the ground "that when I accepted the shilling prescription charge I was manœuvring, but I would rather manœuvre to have Socialism than manœuvre to destroy it."

Both Conservative and Labour Governments have decided to make charges for certain items in the N.H.S. The medical profession, with adherents in its members to the three great political parties, can only murmur, "Well, you may be right." Can it go further? Should it go further? Before it does it can look only with amusement on the internal contradictions within the Labour Party. Dr. Edith Summerskill believes that over-prescribing is "an abuse in the main by the better-off section of the community at the expense of the worse-off." But Mr. Bevan, catching up with the times, finds the cause in the last few years "mainly in the enormous increase in the use of antibiotics, streptomycin, aureomycin, and penicillin," forgetting, perhaps, that in December, 1949, he had said, "It is aspirin, bandages, and so forth, costing less than a shilling, which in a large number of cases could have been purchased by the patient. . . . That is where the abuse lies." And so the politicians go on, trying to wriggle out of their mistakes—mistakes that have cost the country dear. For it was the gross miscalculation of Mr. Bevan and his colleagues that has landed the N.H.S. in its present financial straits. How to get out of it? At least the voice of the economist has for some time been heard suggesting that token charges must be made throughout the Service if it is to be used responsibly. The doctor's principal concern is that such charges should not prevent a patient from receiving the treatment he needs.

[1] See leading article, *British Medical Journal*, March 22, 1952, p. 642.
[2] *Hansard*, March 26, 1952, col. 885.

BEVAN'S BOOK

In last week's debate on the Health Service in the House of Lords, Lord Kershaw said: "So many people seem to regard this great National Health Service as something that came about just accidentally in the mind of a certain gentleman in another place in 1948"—an impression certainly fostered in the chapter on the N.H.S. in Mr. Bevan's book published this week.[1] Here is displayed, to use the current favourite phrase of the author, the "pattern of behaviour" so many are tired of observing in a man who, however brilliant, struts before the world as a self-appointed paragon of political virtue. The world

[1] *In Place of Fear*, by Aneurin Bevan. 10s. 6d. William Heinemann, Ltd.

for him is divided into Bevanites and anti-Bevanites, the former white and right, and the latter black (or blue) and wrong. He begins his chapter on the Health Service by acclaiming the victories of preventive medicine: "Modern communities have been made tolerable by the behaviour patterns imposed upon them by the activities of the sanitary inspector and the medical officer of health." "In this sphere [of preventive medicine] values that are in essence Socialist challenge and win victory after victory against the assertions and practice of the Competitive Society." And yet Mr. Bevan's Health Act has put back the clock of preventive medicine and dismayed and discouraged those in the Public Health Service who under the more enlightened administrations of the Competitive Society had done so much for the progressive improvement of the health of Britons, now engulfed in a sea of free potions and lotions. In a superficial examination of paying for the Health Service through insurance Mr. Bevan inveighs against "local paternalisms." "The benefactor tends also to become a petty tyrant, not only willing his cash but sending his instructions along with it." Mr. Bevan wants only one benefactor—himself?—one tyrant, one issuer of instructions: and so one "pattern of behaviour" imposed from above. What a political pipe-dream!—for the dreamer. So short is his memory that he accuses the B.M.A. of fostering the idea that the N.H.S. was to be paid for out of the insurance contributions; in fact, it was Mr. Bevan's press apologists who did this, and a grave disservice it was. His flimsy defence of the free treatment of foreign visitors is really beneath contempt. Here is what he writes: "The fact is, of course, that visitors to Britain subscribe to the national revenues as soon as they start consuming certain commodities—drink and tobacco, for example, and entertainment. They make no direct contribution to the cost of the Health Service any more than does a British citizen." *O tempora! O mores!*

Mr. Bevan, as might have been expected, does not hesitate to besmirch those who before 1948 looked after the health of the people. He talks of the "innumerable harpies who battened on the sick and who are slowly being eliminated." Again, he writes: "A free Health Service is a triumphant example of the superiority of collective action and public initiative applied to a segment of society where commercial principles are seen at their worst." And, of course, after lip service to the individual doctor, he lambasts the profession thus: "The pretensions of the medical profession as a special social group are resented by the generality of citizens. They savour too much of caste and privilege." He talks of the "collective arrogance" of the profession. What an arrogant man!

Long before Mr. Bevan came into the medico-political arena the B.M.A. in the inter-war years had been making its plans for a comprehensive health service for the nation, and between 1942 and 1948 had advocated that this should be for 100% of the population, with the proviso that opportunities for private practice should be safeguarded. But Mr. Bevan remains true to his "pattern of behaviour" in denigrating the B.M.A., setting up against it—in his estimation—the M.P.U.: "The Medical Practitioners' Union, on the other hand, is a progressive body, affiliated to the Trades Union Congress and more up to date in its views." The trouble with Mr. Bevan is that he is the Peter Pan of politics. He does not grow up. In fact he admits this when he writes this in the second chapter of his book: "As I was reaching adolescence, towards the end of the First World War . . ." He was 19 years old in November, 1916, 20 in 1917, and 21 when the war ended in 1918.

PLASTICS IN SURGERY

The great progress that has taken place in the plastics industry during the last 20 years has led to the wide use of plastics in the manufacture of medical instruments and appliances.[1] The term plastic embraces many substances of diverse chemical structure which have in common the property that at some stage of their development they can be deformed under mechanical stress, without losing their cohesion. This definition includes those substances which in their final state have the property of rigidity. Plastics may be divided into two main groups, thermoplastic and thermosetting materials. Thermoplastic substances are those which can be softened and re-softened as required by the application of heat, whereas the thermosetting plastics undergo a chemical change when heat is applied and set into masses which cannot be re-formed.

Many plastics when buried in the body, because of their low solubility, cause relatively little tissue reaction and are not absorbed; this property has made it possible to leave large masses of plastic in the tissues. Plastics are used in surgery[2] because they are strong and can be relatively easily moulded to a required shape. They are therefore easier to work with than stainless steel and have the added advantage that they are pervious to *x* rays.

The plastics which have been adopted for surgical use all belong to the group of thermoplastic substances. A variety of materials are available, and the more important members of this group are the cellulose derivatives ("cellophane"), polymethyl methacrylate ("perspex," "lucite"), polyethylene ("polythene," "alkathene"), the super-polyamides ("nylon"), and "teflon." The thermosetting plastics such as "bakelite"[3] and the casein plastics,[4] because they cause a considerable inflammatory reaction, have been found to be unsatisfactory.

The amount of inflammatory reaction produced by a plastic varies both with its chemical composition and also with its physical state. When buried in the tissues masses or sheets of polymethyl methacrylate produce little reaction, but Le Veen and Barberio[5] found that if lucite was implanted into the peritoneal cavity as small shavings it caused an extensive inflammatory reaction. A similar finding has been reported in man by Newman and Scales,[6] who found that a polyethylene cup used for an arthroplasty of the hip-joint was abraded and the small fragments of the plastic caused a marked inflammatory reaction. It seems therefore that, although some plastics may appear to be chemically inert, this property depends on the area of surface presented to the tissues. Teflon, which cannot be wetted with water, has been subjected to similar tests by Le Veen[5] and has been shown to produce less tissue reaction than the other plastics.

Although a plastic may be a pure chemical substance other chemicals may be added to it during the course of manufacture, and these latter substances may sweat out of the plastic and cause a severe tissue reaction. Polyethylene film was reported as causing a marked fibrous tissue reaction by Poppe and Oliveira,[7] whereas Ingraham *et al.*[8] found that their samples were almost inert in the tissues. This apparent paradox was investigated by Yeager and Cowley,[9] who found that pure polyethylene film was inert in the body but that sometimes dicetyl phosphate was added to the polyethylene during the course of manufacture, and this produced a film which was highly irritant and caused a severe fibrous tissue reaction. Another difficulty is that the commercial name of a product does not necessarily indicate its chemical structure. Cellophane, for instance, is a descriptive term indicating a plastic material which is produced in transparent sheets; it is manufactured both from cellulose hydrate and from polyethylene.

The first plastic to be used widely in surgery was nylon, which was introduced as a suture material. Apart from the advantage of using a monofilament suture, it has been shown by Aries[10] to produce less reaction in wounds than silk, and in infected wounds leucocytes were found around silk sutures for a longer period of time than around nylon.

Plastics have been used widely in vascular surgery. The use of catheters made from polythene and nylon for intravenous therapy and cardiac catheterization is well known. Tubes of lucite were used experimentally by Hufnagel[11] to bridge arterial defects. Experience of this method of restoring the continuity of arteries, in the second world war, was not encouraging, although in a few cases the tube remained patent. Apart from the tube filling with thrombus, the end of the tube where it is tied into the artery may ulcerate through the vessel wall. The recent development of stored arterial grafts is likely to render this method of arterial anastomosis obsolete. Polyethylene sheet has been used successfully in the treatment of aneurysms. Poppe and Oliveira[7] have successfully treated syphilitic aneurysms of the aorta by wrapping them in polyethylene cellophane which contained dicetyl phosphate. This produced a marked fibrous tissue reaction around the aneurysm. Blakemore[12] has reported the control of arteriosclerotic aneurysms with a rubber band wrapped in polythene tape.

Polymethyl methacrylate has been used with fair success in cranial surgery to fashion plates which will fill in bony defects.[13] It has the advantage over vitallium in being transparent to *x* rays, but suffers from the same defect as vitallium, since an effusion may form around the prosthesis. Originally, because the preparation of the plate took about one and a half hours, the operation had to be performed in two stages. However, Blaine[4] has described a method of preparing the plate which takes about 15 minutes, and this allows the completion of the operation in one stage. Polyethylene film has been recommended as a dural substitute by Brown, Grindlay, and Craig.[14]

Grindlay[15] has described methods for preparing polyethylene tubes for use in the anastomosis of the common bile duct, trachea, and pelvic colon. Polyethylene is not wettable, and therefore it seems

1 Yarsley, V. E., and Couzens, E. G., *Plastics*, London, 1941.
2 Ingraham, F. D., Alexander, E., and Matson, D. D., *New Engl. J. Med.*, 1947, **236**, 362 and 402.
3 Smith-Peterson, M. N., *J. Bone Jt Surg.*, 1939, **21**, 269.
4 Blaine, G., *Brit. J. Surg.*, 1946, **33**, 245.
5 *Ann. Surg.*, 1949, **129**, 74.
6 *J. Bone Jt Surg.*, 1951, **33B**, 392.
7 *J. thorac. Surg.*, 1946, **15**, 186.
8 *J. Amer. med. Ass.*, 1947, **135**, 82.
9 *Ann. Surg.*, 1948, **128**, 509.
10 *Surgery*, 1941, **9**, 51.
11 *Arch. Surg. Chicago*, 1937, **84**, 382.
12 *Ann. Surg.*, 1951, **133**, 447.
13 Elkins, C. W., and Cameron, J. E., *J. Neurosurg.*, 1946, **3**, 199.
14 *Surg. Gynec. Obstet.*, 1948, **86**, 663.
15 *Surgery*, 1948, **24**, 22.
16 *J. thorac. Surg.*, 1948, **17**, 111.
17 Trent, J. C., Moody, J. D., Hiatt, J. S., and McCain, N. C., *Ibid.*, 1949, **18**, 173.
18 Walkup, H. E., and Murphy, J. D., *Dis. Chest.*, 1949, **16**, 18 and 456.
19 Geever, E. F., and Stone, W. F., *Amer. Rev. Tuberc.*, 1950, **61**, 422.
20 *Thorax*, 1950, **5**, 248.
21 *Ibid.*, 1951, **6**, 209.
22 *J. Bone Jt Surg.*, 1950, **32B**, 166.

unlikely that bile salts will precipitate in the tubes. Such tubes were used to restore the continuity of the common bile duct in animals, and the anastomosis was patent a year after operation. These prostheses have been used for the repair of obliterated bile channels in man with satisfactory results. In view of the advances that have been made in reconstituting the ducts by direct suture it is unlikely that this method will be generally adopted.

Interest in plombage for the obliteration of tuberculous cavities has been revived. Wilson[16] reported 15 cases in which hollow spheres of polymethyl methacrylate were used to fill the dead space after extrapleural pneumolysis, but the method has been adversely reported on in several subsequent papers,[17 18] as infection of the extrapleural space and migration of the spheres has occurred. In one case,[19] following infection, a sphere ulcerated into the trachea and caused death from asphyxia. The bad results produced by this technique are probably due to the insertion of foreign bodies into the extrapleural space, where they will press on and cause necrosis of the underlying lung. More satisfactory results have been obtained by carrying out a modified thoracoplasty in which the plombe is separated from the lung by a layer composed of intercostal muscles and the periosteum of the resected ribs. Lucas and Cleland[20] inserted plastic spheres by this method, and Davies, Temple, and Stathatos[21] a polythene pack. Wound effusions occurred frequently in both series, and in some instances the effusion became infected. The method has a place in the treatment of poor-risk cases, because the operation is less severe than a formal thoracoplasty: it can be performed in one stage, and there is no resulting deformity.

The most striking application of plastics has been made in orthopaedic surgery. Arthroplasty of the hip-joint as described by Judet,[22] using a prosthesis of polymethyl methacrylate to replace the head of the femur, has now been carried out many times, and the immediate results have been satisfactory. Whether these plastic femoral heads will wear well over many years is of course unknown. Should abrasion of the prosthesis occur it is probable that a painful stiff hip will eventually develop, and therefore this procedure should be limited, for the present, to patients whose expectation of life is relatively short.

The use of plastics seems thus to be never completely without danger. There is a natural reluctance on the part of surgeons to bury large masses of a foreign body in the tissues, and probably their use will consequently be restricted.

HUNGER AND HYPOTHALAMUS

Classical ideas of the nature of hunger are more descriptive than explanatory and usually concentrate on its most obvious physical accompaniment, the hunger pang. Yet denervation of the stomach, or even its complete removal, influences the urge to eat very little; whether "hunger" is abolished is a matter of terminology. This semantic difficulty applies with equal force to such terms as appetite, satiety, bulimia, and polyphagia, which, as Brobeck has pointed out, have all acquired subjective psychological connotations. Recent physiological work has emphasized the need for a term which describes the animal's adjustment of the amount and quality of the food it eats to its nutritional requirements in spite of wide variations in the bulk, taste, and chemical composition of the diet. This automatic calorimetry by the central nervous system has been inadequately explained as the response to afferent stimuli from the gut, and it seems clear that the animal must somehow measure the metabolites available to it only after it has absorbed them. This could be achieved by specialized receptor cells sensitive, like the osmoreceptors postulated by Verney, to changes in the blood. But neither the localization of these receptors nor any agreement on the nature of their sensitivity has been achieved.

The precision with which the rat adjusts its intake of food to extreme variations in diet, in activity, and in environmental temperature, together with the fact that the reaction to each of these variables can be affected separately by hypothalamic injury, led Brobeck[4] to postulate that the hypothalamus acts as an integrative and controlling centre. As each of the variables can affect heat production, and as thermosensitive cells are known to exist in the hypothalamus, he suggested that food intake might be controlled as part of the normal control of body temperature, "that the animal eats to keep warm, and stops eating to prevent hyperthermia." In 1943, Brobeck, Tepperman, and Long[2] located accurately near the ventromedial nuclei of the tuber cinereum an area bilateral damage to which produced a sustained increase in food intake. As there were no compensatory changes in activity or in heat loss, the rats rapidly became obese. In the absence of an adequate existing word, Brobeck and his collaborators coined the term "hyperphagia" for the increased eating, and in a series of biochemical studies they showed that there were no changes in intermediary metabolism that could have contributed materially to the increase in weight. This work provided the first adequate explanation of hypothalamic obesity. Recently the group have carried our understanding of the hypothalamic control of food intake a stage further by the demonstration of a second area, lateral to the first and antagonistic to it in its action (Anand and Brobeck, 1951).[3] Damage here, even after induction of hyperphagia by an initial operation, causes a fatal anorexia.

1 *Yale J. Biol. Med.*, 1948, **20**, 545.
2 Ibid., 1943, **15**, 831.
3 *Proc. Soc. exp. Biol. N.Y.*, 1951, **77**, 323.
4 *Proc. roy. Soc. B.*, 1950, **137**, 535.
5 *Science*, 1950, **112**, 256.

The hyperphagia has been shown by Kennedy[4] and by Miller, Bailey, and Stevenson[5] to lose its omnivorous character as the rat becomes obese. Although under the best conditions the rat still eats an abnormal amount, it becomes more discriminative, and the attractiveness of the diet becomes a deciding factor in the amount it eats, and consequently of the degree of obesity. Changes in the diet, or in the environment, which have little adverse effect on the calorie intake of the normal animal, inhibit eating and cause considerable weight loss in the one made obese by hypothalamic damage. This suggests that after hypothalamic damage the central registration of satiety depends largely on cortical discrimination, while in the intact animal this cortical mechanism is subordinate to the calorimetric control exerted by the hypothalamus. The clinical association of bulimia (abnormal increase in sensations of hunger) with lesions of the frontal cortex is familiar, and similar effects have been produced experimentally. The physiological studies of Fulton and of Bard have demonstrated the close relation between this area and the hypothalamus, and it seems likely that the higher centres controlling acceptance of food are in this part of the cortex.

The increased food intake without which obesity is impossible may therefore have its origin at different levels in the central nervous system, and in the absence of localizing neurological signs a diagnosis of hypothalamic obesity can have no more justification than the once fashionable diagnosis of pituitary obesity. Bruch has shown clearly that the precipitating factor in many cases is cortical, but it may well be that differences in familial and racial susceptibility originate in genetic differences in the degree of hypothalamic control.

SICKNESS STUDIES FROM INSURANCE STATISTICS

The collection of statistics of morbidity in the general population requires methods which differ from those developed for statistics of mortality. Registration of all sickness, comparable to death certification, is out of the question. In certain limited fields—infectious disease, industrial disease and accidents, and, recently, cancer—it is used successfully, but here the object is to gain control of the situation by therapeutic or administrative procedures as a matter of urgency. The Central Office of Information has adopted one efficient method of obtaining information about general illness in the community through its Survey of Sickness, carried out by interviewing carefully selected samples of about 4,000 persons chosen monthly. This, however, has limitations, and any supplementary method is helpful. Studies of hospital morbidity are being developed, and information on certain diseases has been obtained from the Ministry of Food's records of priority allowances to invalids. To these sources can now be added the data on claims for sickness benefit made to the Ministry of National Insurance—yet another indirect method of recording morbidity, since the information, like that obtained from the Ministry of Food, is primarily collected for another purpose.

Before 1948 the National Health Insurance scheme obtained information on sickness among a section of the working population, and some valuable reports were published from Scotland.[1] The National Insurance scheme, however, now covers practically the entire working population. The only large groups of adults excluded are the dependants of insured persons—mainly housewives—and those who have retired. The Ministry of National Insurance in its second report[2] shows that it is aware of the enhanced value which this change has given to the morbidity data it collects, and has attempted an analysis of the influence of winter epidemics on the population of the whole country. From the recorded number of new claims for sickness benefit made weekly at local National Insurance offices it is possible to plot geographically the great mass of winter sickness, which is mainly of the communicable variety (notably colds and influenza). In the period covered by the report, from July, 1949, to the end of December, 1950, the seasonal trend of new claims did not differ greatly in England, Scotland, or Wales, but local differences within these countries in the early months of 1950 were notable.

The first heavy increase in new claims occurred during the week ending January 10 in the Tyneside area. No other area was heavily affected at that time. By mid-January the wave of sickness had moved southwards through Durham County, and from there it passed through the Tees area to the North and East Ridings, leaving Hull by the end of February. This wave could not be traced further. At the end of January a second wave moved westward from Tyneside, passing through Northumberland into Cumberland and southward to Westmorland by mid-February. An independent wave, with Huddersfield as its focus, started in early February, and moved through the north of Derbyshire into the Manchester and Wigan area, where claims increased sharply in early March. The wave then fanned out northward towards Cumberland and Westmorland, but appeared to miss Liverpool. In Scotland similar but less clearly defined waves were seen. The number of new claims rose in the whole of Southern Scotland at the end of January, reaching a maximum in the industrial belt in early February. The wave then spread northwards up the east coast into the north-east, and through the Midlands to the north-western highlands and islands.

The Ministry has thus shown an interesting method of tracing the geographical pattern of disease in this country. Without distinction between the groups of separate diseases in the total of sickness benefit claims the picture is necessarily imprecise, and it may be that great and unjustified labour would be required to obtain this additional information. The technique, however, is in its infancy, and the Ministry's next report, with its account of the influenza epidemic of last winter, will be awaited with interest.

[1] *Department of Health for Scotland. Sickness Statistics for the Insured Population of Scotland. Report for the year July 1, 1930, to June 30, 1931*; and *2nd to 7th Reports on Incapacitating Sickness in the Insured Population of Scotland* H.M.S.O., Edinburgh.

[2] *Second Report of the Ministry of National Insurance*, 1951, H.M.S.O., London.

REFRESHER COURSE FOR GENERAL PRACTITIONERS

THE PSYCHIATRIC CASE AND THE LAW—I. GENERAL PRINCIPLES

BY

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Although quite a large proportion of the patients seen by a general practitioner are suffering from psychiatric disorder of one kind or another, the occasions on which he is expected to comply with statutory conditions in order to secure their proper treatment are relatively rare. He is expected by his patients and their relatives, however, to know the law when he is called upon in times of domestic crisis, and the law itself regards him, as a duly qualified medical practitioner, as having some expert knowledge in matters of soundness of mind, responsibility, and psychiatric treatment. To learn intimately the scattered and much-amended structure of the law relating to the consequences of mental disorder is a major task, and it is not to be wondered at that many medical men prefer to avoid any involvement with it. In particular there is often hesitation to sign any kind of document lest it later become the subject of legal action.

If, in fact, he understands the spirit and purpose of the law, knows where and when to seek assistance, and acts in good faith, the practitioner has little to fear. The worst that can happen is that his time will be wasted by the occasional patient who feels he has a grievance, and by the long explanations demanded by relatives whose desire to see the patient treated is tempered by the conviction that his certification is a reflection on the family's mental stability.

The object of this article is to explain the spirit of the law and the ways in which it normally works, and to indicate where the letter of the law may be consulted should the need arise and how to make contact with the appropriate officials. Reference is also made to the conditions in which it is necessary or advisable from the legal point of view to call in a consultant. Part II will deal with the admission of psychiatric cases to hospital.

Some General Principles

1. The statutes which deal with *unsoundness of mind* are not directly concerned with medical diagnosis. They were created for the protection of the individual who is unable through no fault of his own to understand the obligations or to conform to the standards of behaviour normally required of a citizen. They are also concerned with the protection of society from the effects of this kind of disability. The decision whether or not a person is of unsound mind is therefore a social rather than a medical one, and medical terminology has no place in the procedures involved. In fact, when a patient is certified under the Lunacy Act of 1890 the final decision on whether he should be under care rests with a layman—namely, the judicial authority who signs the reception order—although he is usually content to be advised by the certificates of the medical men who have examined the patient. So desirable is it that one of these certificates should be signed by the general practitioner, who has usually had special opportunities of assessing his patient's attitude to the affairs of daily life, that if he is not able to do so the reason must be stated.

2. When questions of *prognosis* and *treatment* arise the issues are by contrast entirely medical. Although anyone whose name is on the *Medical Register* is regarded as having special knowledge of mental disorders for the purpose of certification under the Lunacy Acts or for giving evidence in the courts, the more recent Acts lay down that for some types of certification the medical man's name must be on an approved list, and to this extent they recognize the need for a specialist opinion. Such approval is required for the following purposes and is given separately by the authority concerned: (*a*) For giving one of the certificates necessary for temporary treatment (Mental Treatment Act, 1930, Section 5—Approval by the Ministry of Health). (*b*) For approving the acceptance of a person under 16 as a voluntary patient in the absence of the usual medical attendant (Mental Treatment Act, Section 1—Approval by the Ministry of Health or by the Local Authority). (*c*) For giving one of the two certificates required in the case of mental defectives (Mental Deficiency Acts, 1913-27—Approval by Ministry of Health or by Local Authority). (*d*) For certifying that a child of school age is educationally retarded (Education Act, 1944—Approval by Local Authority). The statutes thus very reasonably call for the intervention of a specialist in the case of the acutely ill but recoverable patient and for the assessment of mental abnormality in children.

3. From time to time patients who have been detained in mental hospitals on reception orders based on medical certificates try to bring actions for damages against the doctors who have signed the certificates. It has been decided in two important cases (*Everett* v. *Griffiths*, 1921, and *Harnett* v. *Bond*, 1924) that it is the certificate which is the cause of the patient's detention, and that the doctor may be liable if it can be shown that he has not acted in good faith and exercised reasonable care. In the Mental Treatment Act of 1930 (Section 16), however, the danger to the practitioner even from unsuccessful actions of this kind is recognized, and it is laid down that no proceedings may be brought against him without leave of a High Court judge. The application for leave may be opposed by the doctor, or by a defence organization on his behalf, and it can be granted only if there is substantial ground for the contention that the practitioner has acted in bad faith or without reasonable care. Where the doctor signs the certificate as part of his work for the National Health Service or for a local authority, the Limitation Act of 1939 (Section 21) lays it down that such actions must be brought within one year, thus removing to some extent the possibility of sudden legal action by a patient who has nursed a grievance for a long time.

In practice, all the practitioner needs to know is printed on the certificates themselves, or in the marginal notes added by the legal stationers who publish them, and if he follows these instructions, does not exceed his duty, and treats the occasion with the seriousness it deserves, he can hardly go wrong. He is not liable if facts are misrepresented to him by others in whose word he might reasonably be expected to have faith.

4. On general grounds it is most unwise for a doctor to take any part in the certification of a patient if the consequent suspension of the patient's rights might possibly be construed as benefiting himself. For this reason the Lunacy Act of 1890 (Section 32) prohibits the giving of certificates by such persons as the medical staff of the hospital to which the patient is being admitted, members of the management committee, or any person interested in money paid on account of the patient. Where two certificates are required,

the doctor signing the second must not be a partner, assistant, or relative of the practitioner signing the first. Further, except in the case of temporary patients, the examinations must be entirely separate. These precautions are necessary when it is considered that even in these enlightened days many relatives of patients are difficult to convince that the doctors are not gaining some advantage by depriving the patient of his liberty. Before the passing of the Lunacy Act of 1846, which followed the efforts of Lord Salisbury, the suspicions of the public were not always without foundation.

5. The aim of legislation in the past 50 years has been gradually to bring the treatment of psychiatric disorders into line with that of other forms of illness and to combat the prejudices which in the past led to early disease being concealed because it was felt that once a patient had entered a "lunatic asylum" all was lost. Successive Acts have brought changes in terminology which mean more to patients and relatives than might appear. In explaining legal formalities to relatives it is most important to use such words as "patient" and "hospital" where possible and never for a moment to be tempted to use colloquialisms or the terminology of the earlier Acts. At the same time it is essential that all concerned should, if possible, understand what is being done and have no ground for subsequent complaint that they had not been told.

Preparation of Certificates

Although medical certificate forms with their marginal notes and instructions leave little to the imagination, a considerable proportion of those scrutinized by H.M. Commissioners have to be returned for minor alterations or because they do not contain satisfactory evidence of unsoundness of mind from the legal point of view. In order to avoid this the practitioner has only to give close attention to detail and keep constantly in mind the purpose of certification. The circumstances in which certificates sometimes have to be prepared make this extremely difficult, and it may be necessary to insist on enough privacy to escape a barrage of distracting advice, questions, and superfluous information, quite apart from any emotional displays provided by the patient or his relatives. At least one responsible relative should be asked to give an independent account of the illness, preferably by coming to the surgery, and if the patient himself is able to give a coherent account he should be seen alone. Notes should be taken at these interviews and should include in the case of the patient some verbatim material. The certificate, which must be as brief as possible, can be based on these notes, which should always be kept with a copy of the certificate.

In the course of his inquiries the practitioner must first of all satisfy himself that it is right for the patient to lose his liberty in the interest either of himself or of the public. Having done this he must then find from the history given by the relatives and from his own examination the evidence which, when seen in writing, will convince even the most sceptical person, medical or lay, that the patient is of unsound mind.

The patient must always be examined specially for the purpose and should be afforded the opportunity of giving a "free" history before leading questions are asked. It is important to ascertain whether he is normally oriented in place and time, and whether he mistakes identities or remembers events which have not taken place. The possibility of hallucinations and of suicidal tendencies must always be explored, for they are often missed if specific inquiry is not made. These inquiries should be left to the end of the examination, though if tactfully made they give rise to protest far more rarely than is generally thought.

The section of the certificate for "facts observed by myself at the time of the examination" should be completed solely on the basis of the clinical state observed and the information elicited or confirmed at the interview. The patient's demeanour and behaviour should be briefly described if they are abnormal, as well as his expression, any irrelevance in his answers, or the fact that he is mute. Specific instances are much superior to general statements. "He states that he is the Lord Harry" is much more convincing than "He speaks as if he were a person of great importance." Similarly, "He believes that his bowels are stopped up" is much better than "He is preoccupied with gloomy hypochondriacal ideas." Verbatim material may be given on the certificate. Much patience is often needed to elicit the fact that the patient suffers from delusions, is hallucinated, or contemplates suicide, but such features are convincing evidence if obtained.

In the section devoted to "facts communicated by others" the name and description of each informant must be given followed by the essential part of their story—for example, "P.C. Alfred Parkins, Whinshire County Constabulary, states that this morning he prevented the patient from throwing himself into the canal and that the patient said, 'The Treens are controlling my body with magnetic rays.'". Particular difficulty may be encountered with patients who have delusions of persecution but who are well aware of the significance of the examination and attempt to conceal their beliefs, and with epileptics who are subject to attacks of violent behaviour but are no more than sullen in the intervals. Here the strength of the certificate may have to lie in the facts communicated by others. Attempts at suicide, violence, self-neglect, or shameless behaviour described by credible witnesses must be carefully set out in this section.

When the certificate is complete and the documents are being assembled it is wise to allow a colleague or an experienced duly authorized officer (D.A.O.) to look through it for minor errors of detail.

Fees for Certification

When a general practitioner is asked to examine and certify a patient he is entitled to reasonable remuneration (National Health Service Amendment Act, 1949) from the local authority unless it is considered to be part of the general medical services he renders to his patients under the National Health Service Act. Some areas pay a fee on the ground that there is no reference to certification in the practitioner's contract and that it cannot be regarded as a normal service. This matter is still the subject of negotiation. In the case of a private patient the basic fee charged by the practitioner is usually two guineas.

The Duly Authorized Officer

The D.A.O. is an official of the local authority under the direction of the medical officer of health. These officials were first described in the Mental Deficiency Act, 1913; and the Mental Treatment Act, 1930, widened their powers to enable them to deal with persons of unsound mind. The D.A.O. is appointed by the local health authority to carry out in a prescribed area certain duties in connexion with the finding and admission to hospital of psychotic patients and mental defectives. Most of these duties were formerly carried out by relieving officers under the Lunacy Act, and the dissociation of mental health duties from the Poor Law atmosphere has been a welcome change. In cities, and in areas where the density of the population is sufficient to warrant it, the D.A.O. may devote the whole of his time to this work and he becomes, in effect, a lay mental health officer who often develops by experience a considerable knowledge of the practical and legal aspects of the subject. In areas where a full-time officer has not been appointed other officials are authorized to act when necessary. Courses are now being organized for the training of D.A.O.s who may also undertake mental aftercare work for the local authority as well as the supervision of mental defectives. It is probable that before long there will be throughout the country much greater uniformity in their duties and in the standard of training and experience acceptable in applicants for these posts. The telephone number of the D.A.O. and

of his deputy should be kept to hand. They will usually be found in the telephone directory under the name of the local authority health department. In cities there is often a rota of D.A.O.s on duty, and particulars of this can be obtained from the office of the medical officer of health.

It is important to remember that the practitioner, in notifying the D.A.O. of the existence of a person of unsound mind, must leave the action to be taken to the discretion of that official, with whom the final responsibility rests. A position quite often arises, as it did before 1948 with relieving officers, in which the doctor may feel that he should tell the lay official what to do about the case. The D.A.O. on the other hand may compensate for any sense of inferiority he feels by making it quite clear that the statutes lay it down that any action is entirely at his discretion, as in fact it is. He will often know more about the legal possibilities than the doctor and may have seen many more acute psychiatric cases. Both have much to gain from mutual co-operation in the interests of the patient, and the practitioner will do well to discuss the matter with his lay colleague and to ask his advice about the statutory procedure to be adopted. The D.A.O. on the other hand will usually prefer to have his decisions backed by a medical opinion. A good understanding with the D.A.O. will, in fact, greatly simplify the practitioner's task in dealing with acute mental cases in his area, and, moreover, the D.A.O. is usually a most useful source of information both on the statutes relating to his work and on the different social agencies which can help with psychiatric problems.

[*Part II will be published in our next issue.*]

MISSION TO LATIN AMERICA

BY

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Political and economic circumstances have been largely responsible for the lack of contact between the medical profession in Great Britain and in the countries of South and Central America. The war years and the restrictions on travel maintained this isolation, and it has only been in the last few years that an organized visit or tour could be regarded as practicable. There were indications from various quarters that a mission would be welcome, and that a friendly reception would be given to a small group of doctors from Britain who would be able to spend six or eight weeks visiting selected medical centres in Latin America. Four medical men were therefore chosen to form a mission, which was sponsored by the British Medical Association, and travelled with the administrative help of the Foreign Office.

Aims and Composition of the Mission

The aim of the mission was to establish professional and cultural relations in Latin America, and to open channels for a freer exchange of medical information and experience. In many of these countries geographical and economic factors have limited postgraduate training for young doctors to visits to their North American neighbours, whereas before the war their seniors had been able to come to Europe. It was felt that a mission might stimulate the desire to visit the educational centres of Europe; and that those interested in special aspects of medicine might travel more freely between the two continents. These aims were endorsed by a number of the more senior medical men in the countries visited. Time and financial resources unfortunately restricted the final programme, so that it proved impossible to visit several countries which had expressed a wish to receive the mission.

The team of four consisted of two physicians, a surgeon, and an anaesthetist. Each member submitted in advance a list and summary of lectures and demonstrations in his own specialty which he thought to be representative of the work in Britain, and in each country which was visited a reception committee, consisting of senior members of the universities, faculties, academies, and colleges, was set up and this body selected and prepared a programme. At most places each member gave three or four lectures, and in addition a number of operations were performed. Some 40 to 100 doctors and students were usually present at these lectures, but many more people attended the addresses of a less technical character and of a more general interest. As is usual, the informal addresses and demonstrations that followed lectures were keenly discussed and debated. The hospitality accorded to the mission was as complete as the programmes.

The Itinerary

The mission left England in October, 1951, and flew in great comfort by B.O.A.C. via Lisbon and Dakar to Brazil, where, in Rio de Janeiro, Professor Jorge Grey generously made the facilities of his surgical clinic available, and undertook much of the organization. Dr. Mario Almeida—an honorary member of the British Association of Anaesthetists—had developed an efficient service in a subject that had been previously rather neglected. The Director of the Oswaldo Cruz Institute, Dr. Henrique Aragao, showed the mission round his hospital and stressed the social importance of schizotrypanosis. He also demonstrated patients from the forests of the north suffering from the acute and chronic forms of Chargas heart disease. This condition is one of the very common causes of enlargement of the heart in Brazil, although it is almost unknown in Europe. Dr. Pedro Nava, the president of the Rheumatic Association, showed that the local problems of rheumatism were similar to those in Britain.

In São Paulo, only one and a half hours distant by aeroplane, there was a most active university medical centre in a rapidly growing city. Operations and lectures were carried out at the Hospitals Clinicas and Santa Casa.

Port of Spain in Trinidad was reached by a non-stop flight, punctuated by many thunderstorms, from Rio across Central Brazil. Here the mission was welcomed at two in the morning by the members of the Island's B.M.A. While the surgeon, with the assistance of Mr. Joe Pierre, operated at the new Caura Sanatorium (Dr. Branday), the physicians were consulted on the various problems of social and general medicine that were peculiar to Trinidad. At San Fernando in the south of the island the members of the mission climbed the skeleton of the new Colonial Hospital (Mr. Shepherd) that is being built, and helped in the planning of a modern physical medicine department. At the oilfields there were well staffed and equipped hospitals where the clinical work was excellent, although Dr. Finlayson, the C.M.O. of Trinidad Leaseholds, and Dr. Ahin, of Shell, pointed out that they were only now beginning to tackle the problems of social and industrial rehabilitation.

Five days later the mission flew to the coastal airport of Caracas, the capital of Venezuela. Here the hospitals are both of old colonial and modern pattern, and the old city hospital, Vargas, was reminiscent of many hospitals in Paris and Spain. Professors Perez Carreño and Borja were in charge of large and efficient surgical clinics, and Dr. Alberto Paris, who had worked in England as a British Council scholar, kindly made arrangements for operations to be performed in his own hospital and other institutions. Centro Medico, a large private clinic, was a most lavishly equipped building in which many of the leading doctors had their consulting suites. There were some 60 rooms for private patients, who paid as many dollars for their keep as they would have done pounds in London. Dr. Tervel, another British Council scholar, was equally helpful to the physicians.

Maracaibo, the city of the Venezuelan oilfields, has sprung up in the last 25 years from a village to a large city of over a quarter of a million inhabitants, and is the centre of the University of Sulia. Professor Leonardi, in charge of the Surgi-

cal Hospital, and Dr. Iturbi, of the district sanatorium, have developed highly efficient units in modern hospitals. The medical services of the Shell group, under the charge of Dr. Hernandez, employ some 40 Venezuelan doctors, each of whom is both a general practitioner and a specialist in some such branch as otology, urology, and dermatology. These men had been sent to North America or Britain for postgraduate training. Company scholarships are available for six selected candidates to study medicine, six for a nursing diploma, two for a degree in pharmacy, and one in laboratory technique. The close relationship between curative, family, and preventive medicine was most refreshing and carried some valuable lessons for those responsible for modifying our National Health Service.

At Panama City, Dr. Conte Mendoza, who acted as secretary to the reception committee, with other graduates from Bart's have kept British influence to the fore. Lavish hospitality was provided by two former Presidents of the country and another old Bart's man, Dr. Adolfo Arias. The United States Medical Services from the Canal Zone also took part in the programme. Major-General Rice, Health Director of the Panama Canal, and Colonels Blitch and Kintz, in charge of the hospitals, escorted the mission round the canal zone.

Guatemala City, situated high up within a fringe of volcanoes, was one of the most picturesque of all the places visited. Lectures were given at the Academy of Medicine, of which Dr. Lizzaralde was the doyen. The Institute of Nutrition was a most lively organization, under the charge of an American physician ably assisted by a well-trained Guatemalan technical staff.

At Mexico City members of the mission lectured, among other places, at the Institute of Cardiology, and operated in Dr. Alarcon's sanatorium and the Military Hospital. The new university city is as yet incomplete, but the hospital area consists of a general hospital, surrounded by admirable institutes of paediatrics, orthopaedics, cardiology, and nutrition. The Institute of Cardiology has been created by Professor Ignacio Chavez with the help of friends as well as patients. It was a most stimulating centre where many workers were engaged in the investigation and treatment of cardiovascular disorders, particularly rheumatic heart disease. The testing of new drugs, the application of new physical methods, and the training of the cardiac cripple were all included in the programme there.

The final visit was to Havana, where the Calixto Garcia University Hospital is surrounded by the Doctors Hospital and institutes of maternity, orthopaedics, paediatrics, and cancer. Other modern hospitals of excellent design include the Maternity and the Carlos Finlay Military Hospitals, and the Esperanza Sanatorium. Drs. Ramon Aixila and Bustamente spared no effort in ensuring the success of the visit, and were ably helped by Drs. Lastra, Rodriguez Diaz, Banet, Angel Reaud, Araujo, Cowley, Calero, and others. Professor Castellanos, who was the pioneer of angiocardiography, was in charge of the Institute of Pediatrics and is continuing his research in heart disease. Professor Tarafa, the eminent orthopaedic surgeon, has built the Franklin Delano Roosevelt Rehabilitation Centre with the generous assistance of North American and Cuban benefactors.

An example of modern hospital architecture. The Carlos Finlay Military Hospital at Havana.

General Impressions

After a short visit an impression is all that can be offered. Latin America can be likened to Europe. Each country has its own culture and individual tradition. The medical training in all countries was efficient and adequate, with students undertaking considerable responsibilities in their later years. Where the full facilities of a university were absent some parts of medical training had to be undertaken abroad. Consultant staffs were invariably of a high order, and were clearly regarded as people of considerable social and political importance. The practice of general surgery and medicine left little to be desired, but special branches were not so advanced. There were not enough nurses, but the trained staff was efficient, though the standard in operating theatres was not as high as in this country. The facilities for physical medicine and modern rehabilitation were poor. This may in great part be due to the fact that a man who is unable to work is not a heavy financial liability to the State: either his relations care for him or he has to fend for himself.

As at home, the relations between Government services and members of the medical profession were not always harmonious, both parties alleging on occasions that the other did not fully appreciate their obligations to the sick. But the tendency is towards an improvement in the medical services which will parallel the magnificent achievements in public health work. In one country the medical profession took the lead, in another the Minister of Health. The latter—who is always a medical man—was in most countries an enthusiastic and practical exponent of social medicine.

In Havana there were a number of *centros*, or insurance hospitals. The subscribers obtained increasingly good conditions for treatment as the competition between the different societies developed. We were impressed by the comprehensive services that were provided, which, being the result of private enterprise, had to be self-supporting. The modern maternity *centro* was said to have the best part of a million members. The fact that these institutions had developed and were self-supporting should surely contain some lessons for other countries. From the doctor's point of view the relatively low rate of pay was undoubtedly causing some uneasiness, and if continued might lead to the staffing of these *centros* by junior or less experienced men.

Many of the hospital buildings were modern and often extravagantly equipped, but there were never enough beds to meet the total needs of the population. Some of the show places, such as the Hospital of the State Services in Rio, the Creole Hospital in Maracaibo, the Institute of Paediatrics and Orthopaedics in Mexico City, the Maternity and Military Hospitals in Havana (see illustration), were far in advance of those at home. But they provided services for only a very small part of the population.

The tropical or semi-tropical climate has influenced hospital construction in the interests of coolness and ventilation, and the operating theatres are usually air-conditioned and kept at a low temperature. Special institutes are of fine modern design, and if, as in Mexico or Havana, they are grouped round or near the general hospital, there are obvious advantages in preventing isolation of the specialist medical staffs.

Private clinics and hospitals are numerous and furnished with every convenience, so that the patient who is willing or able to pay is fully catered for. Special mention should be made of the tuberculosis services, which in some countries were well developed with domiciliary control and active and "chronic" sanatoria with full surgical facilities. The Venezuelan services, which owe much to the energies of

Drs. Baldó and Iturbi, follow the general outlines accepted in this country, with local modifications to meet the needs of the more primitive members of the population. This service contrasted vividly with that in another country, where a few beds in a general hospital are the only evidence of active treatment.

Convalescent homes and rehabilitation clinics were rare, and a general criticism is the failure to bridge the gap between hospital treatment and a return to normal life. An exception was the centre in Havana already mentioned, where a diagnostic centre co-ordinated the activities of surgeon, physiotherapist, and social worker. We noticed the lack of trained physiotherapists in all countries.

Surgery

The training and standard of general surgery were sound in all places visited, though shortages of nurses and of beds were admitted handicaps in some countries. Sometimes the general aspects suffered from the amount of attention centred on special institutes, which had the advantages of modern structure and were well equipped. The accepted specialties are usually carried out by general surgeons because there is not enough work to make special units economical. In consequence, these subjects were not well developed, though such operations as lung excision were performed routinely.

The assessment of patients was invariably thorough and at times excessive, but the actual pre-operative preparation was often brief, and the absence of physiotherapy, certainly in thoracic work, was unfortunate. Surgery in pulmonary tuberculosis was frequently undertaken, and, in spite of a bias towards resection, thoracoplasty and other collapse operations were still regarded as the basis of active treatment once the disease had been stabilized by conservative measures and the free use of chemotherapy. The larger sanatoria had surgeons attached to them, but these men did not always have full opportunities for non-tuberculous surgery. The course of phthisis did not show the variations that might have been expected; negroes were admittedly vulnerable, but the Indians and mixed races responded reasonably well to treatment, though it was difficult to prevent them cutting their treatment short.

Lung surgery for infective conditions and growths was accepted as a routine, though the results were not always satisfactory in the absence of established team-work.

There were many requests for demonstrations in oesophageal surgery, and it is interesting to record that two patients with ruptured oesophagus were operated on, in addition to a number of excisions undertaken for oesophageal cancer.

The greatest interest lay in heart surgery, in which pioneer work has been done in some of the countries visited, as for instance that of Castellanos on cardio-angiography. A number of operations on patients with mitral stenosis, pulmonary stenosis, and patent ductus arteriosus were safely performed.

Minor points of interest were the almost complete absence of staphylococcal and streptococcal infections in Venezuela, and the lower frequency of rheumatic heart disease in the same country as compared with that in Brazil.

Anaesthesia

Anaesthesia has progressed in varying degrees along the road to full specialist status in the countries we visited. In Brazil the greatest advance has been made, for there they are training their own men. The senior anaesthetists were trained in North America, but the present generation is learning at home. The instruction in the subject is almost entirely postgraduate, and takes the form of an apprenticeship to one of the established anaesthetists. At first, those training act merely as assistants, keeping charts, filling syringes, etc. Next they give anaesthetics under supervision and progress to selected cases, and finally have lists on their own. There is an active society of anaesthetists, and the younger members are encouraged to present their difficult cases for discussion, but such cases are only accepted if accompanied by a full clinical record. This is a great incentive to the keeping of records.

In Mexico and Cuba full specialist status is already accorded to the anaesthetists, but they have usually undertaken postgraduate study in North America to obtain recognition. In Venezuela the transition from nurse technicians is in progress, and although they have a few highly skilled men most of the work is done by non-specialists. They are hoping to overcome this by running a course of instruction in the basic sciences and practical anaesthesia at two of the State hospitals.

In Trinidad, both in the Colonial Medical Service and on the oilfields, anaesthetics tend to be given by the junior medical officer, although there are two well-trained anaesthetists on the island.

Except in Brazil and, of course, Trinidad, the equipment was all North American. All gases had to be imported, and, as nitrous oxide by semi-open methods is very expensive, cyclopropane in a completely closed circuit has remained the most popular agent. The relaxants are widely used, but, if it be possible, too cautiously, the tendency being to use deep anaesthesia and a minimum dose of relaxant. It is unfortunate that decamethonium bromide is regarded as the relaxant commonly used by British anaesthetists.

Rheumatology

Rheumatology was, as we felt it should be, regarded as part of general medicine. The essential social and industrial links were usually absent and almoners were rarely seen at hospital clinics. Physiotherapy and occupational therapy departments, even when they did exist, were sadly understaffed. Almost everywhere doctors wanted to know about the antibiotics and cortisone, preferably for injecting into their patients, but to most the idea of the management of the patient or of team-work was regarded as Utopian. Physical medicine is not as yet a specialty, but modern physical methods, such as ultrasonics, are used in many of the private clinics.

Psychiatry

Psychiatry, perhaps more than other specialties, is markedly influenced by the cultural and economic background of the country, and this was certainly well illustrated during the tour. In South America there are still extremes of wealth and poverty that are no longer seen in Western Europe. Against this background it is scarcely surprising that there is a wide difference in the treatment facilities for private and hospital patients; as yet there are inadequate arrangements for the rapidly developing salaried class. Technically the specialty is well developed, but in most countries the public mental hospitals are overcrowded and the standard of treatment is impaired by shortage of staff. The same situation exists in Trinidad, where the medical establishment is substantially below the standards of this country.

The private clinics are usually excellent, with good equipment and staff trained largely in the United States. Dr. Bustamente, in Havana, with a small team operating a busy psychiatric practice, is evolving interesting methods of group therapy for private patients.

São Paulo, in Brazil, was particularly remarkable because of the great industrial developments taking place there. The city has changed in a hundred years from a colonial village into the world's fastest-growing city with a population of nearly two millions. The leading industries are spinning and weaving, tanning, light engineering, chemicals, and the handling of coffee. So fast is São Paulo growing and such is its potential for further growth that it may well become the greatest city in South America by the end of the century.

With this background it is scarcely surprising that the psycho-social problems of industrialization are so much in evidence, and many of the psychiatrists, such as Dr. Bastos and Dr. Odair Pedroso, are well alive to them. There is clearly need for a programme of rehabilitation, and many of the industries would probably co-operate if encouraged. There is an equally challenging situation in Mexico City, which has a population of a million and a half and where rapid industrialization is also taking place. Professor Alfonso Millan is doing a great deal to propagate community psychiatry in Mexico, and it is significant that Mexico City was chosen for the World Federation of Mental Health Congress last December. The Ministry of Social Security is developing a programme of social and health services in the country districts, while a rehabilitation centre for 200 out-patients at a time is being started in the city under the guidance of Dr. Farrill.

It is important to realize that these social and industrial changes are taking place against the background of Latin American culture, which is Catholic, patriarchal, and in which family ties are particularly strong. The impact of the American way of life, which is more matriarchal, competitive, and industrialized, is having a marked effect on the younger generation. This is perhaps partly responsible for the increasing incidence of neuroses and psychosomatic disorders to which so many colleagues made reference in all the cities visited.

There is a wide range of practical knowledge of rehabilitation in the English-speaking countries that could be applied with suitable modifications in Latin America. Quite apart from the prevention of human suffering, the development of such a programme is certainly the best way of bridging the gap between the medical and social sciences, the Government, and industry that is apparent in Latin America and that may well produce serious social tensions in the years to come.

Public Health

In the cities the most striking feature to the visitor is the efficient sanitation and the almost complete absence of insect life. The effective control of yellow fever, malaria, and enteric infection is one of the great achievements in medicine, and the names of Carlos Finlay, in Cuba, and Gorgas, in Panama, are rightly honoured. But the control has to remain active, and this is witnessed by the disinfection of aircraft and the taking of temperatures on landing in some countries. The main problem would appear to lie in the tendency of the Indian and Negro population to leave their agricultural and rural surroundings and to seek a precarious existence in the cities. This causes an acute housing shortage, and "shanty towns" of unsavoury appearance must present a real difficulty to public health authorities. The discovery of incalculable sources of mineral wealth in some countries (oil in Maracaibo, for example) has led to a mushroom growth of some cities, where the outward paraphernalia of modern wealth contrast with the primitive life of Indian tribes not many miles away. Arrow wounds and mauling injuries by panthers are still treated in the city hospitals.

Snakes, particularly in Brazil, constitute a grave danger to men and cattle, but this terror has been reduced by the magnificent work of the Butantan Institute in São Paulo. Here venom is collected from snakes, spiders, and scorpions and, after transference through horses, is prepared as dry anti-venom and distributed throughout the country, where it has saved many lives. This institute is actively interested in ecological problems and possesses a unique museum showing all aspects of the anatomy, chemistry, and behaviour of these poisonous creatures.

Conclusion

Though there are continual interchanges and conferences between the various countries of Latin America, the overriding influence is undoubtedly derived from North America. Many physicians and surgeons have done their postgraduate studies in North American clinics and speak English fluently. In spite of the existence of many good medical libraries European medical literature is not widely studied and many well-established journals are virtually unknown. Admittedly much of the extensive Latin American literature is equally unknown to us, but even though written in Spanish or Portuguese these papers usually have summaries in English.

The interest taken in all facets of British medicine shows that many medical men would like to study with us if the opportunities were provided. The rate of monetary exchange and the speed of air travel are advantageous to visitors to Britain, and the British Council has already given a number of postgraduate scholarships. Those British Council scholars whom we met showed that they had made great use of the facilities offered to them. Further encouragement would be a great service to developing a closer liaison between the continents.

Adequate acknowledgment of the courtesies and hospitality shown cannot possibly be made, but we would wish once again to express our real appreciation to those who organized the programmes and who entertained us, and to the Embassies and their staffs for their invaluable help and kindness in many matters both professional and personal. We hope that we may soon have the opportunity of returning some of the hospitality which we received from our Latin American colleagues, whether they come as members of a mission, participants in a congress, or as individuals visiting this country.

HEALTH SERVICE COSTS

[BY A SPECIAL CORRESPONDENT]

Has expenditure on the Health Service been stabilized? The maintenance of the limit of £400m. for another financial year—before the Danckwerts award was announced—prompts this question. Speaking last week in the debate on the new Health Service charges, Mr. Aneurin Bevan said that after only one full year of the Service (1949–50) people had shown a predictable pattern of behaviour towards it which enabled realistic estimates of its cost to be made. Yet if he had still been Minister of Health he would have been hard put to it to have retained the limit of £400m. without either imposing charges or cutting the hospitals' budgets. As the following Table shows, the fall in the cost of the dental and supplementary services in the new financial year (1952–3)—the two services in which, as Mr. Bevan rightly said, there was a big pent-up demand in the first two years—has been nearly all taken up by heavier expenditure on the hospitals.

Where the Money Goes

Health Service Estimates

Total Net Cost to Taxpayer	(£m. 1950–1* 377	1951–2 398†	1952–3 392†
Grants to local health authorities	16·8	18·6	20·6
General-practitioner service ...	47·4	48·4	48·5
Pharmaceutical service‡ ..	39·0	43·6	39·9
Dental service‡	45·5	36·2	20·1
Supplementary ophthalmic service‡	21·9	14·6	6·3
Grants to hospital boards ..	251·1	274·3	295·6
Of which maintenance	*244·3*	*260·8*	*285·7*

* Actual, except for hospitals' maintenance expenditure, which is estimated.
† Excluding Civil Defence.
‡ Allowing for charges to patients.

There is no escaping the fact that expenditure on the hospitals could be expanded indefinitely, and so long as a limit is imposed on total Health Service costs any expansion has to be offset by economies elsewhere.

To a large extent the local health authority services both complement and spare the hospital services, and they might relieve the burden on the hospitals even more if they could be further expanded. Unfortunately, a big expansion is blocked not only by the Health Service limit but by the other demands on the local authorities' rate income.

Expenditure of Local Health Authorities*

	(£m.)		
	1950–1	1951–2	1952–3
Health centres	†	†	†
Care of mothers and young children	9·3	9·4	9·4
Midwifery	5·0	5·0	5·3
Health visiting	2·7	2·7	3·0
Home nursing	4·2	4·3	5·4
Vaccination and immunization	0·5	0·5	0·6
Ambulance service‡	7·9	7·9	9·3
Prevention of illness and aftercare	1·7	1·7	2·1
Home helps	3·4	3·5	4·5
Mental health	1·7	1·8	2·1
Miscellaneous	0·2	0·2	0·2
	36·6	37·0	41·8

* Including estimated expenditure from rates.
† Less than £100,000 in England and Wales.
‡ England and Wales only.

The slightly higher total expenditure on the local authorities' services in the new financial year barely does more than offset the fall in the value of money in the year just ended. The increase of £1m. in the home nursing and home-help services, on the other hand, probably implies some expansion—with a consequent relief to the hospitals. But in spite of efforts to economize in the ambulance service, which is a by-product of the hospital services, its cost shows an increase of over £1m. It is interesting to note that in Scotland, where health centres are borne on the executive councils' vote, an estimate of over £100,000 on these is shown for 1952–3, which is more than the estimate for expenditure on health centres by local authorities in England and Wales.

The estimate for the general-practitioner service has been put into the melting-pot by the Danckwerts award, which will increase the expenditure in 1950–1 by about £9.75m., with corresponding increases in subsequent years. In last week's debate Mr. Crookshank, Minister of Health, explained how the award would affect the £400m. limit. He said that the back payments for early years would not be counted against the limit. For 1952–3 the £10m. would be included in the estimate, and the limit would be extended—but not by very much, as there is a margin of about £8m. in hand. In other words, the award for the general practitioners is to be met out of taxation, not by increasing the charges under the new National Health Service Bill.

The Drug Bill

Of the charges to be imposed there is no doubt that the shilling for prescriptions is the most unpopular. Yet the increase in the drug bill is so startling that it is difficult to see how a charge could be avoided—if the limit of £400m. were to be retained. Certainly appeals for economy and for the prescription of non-proprietary preparations, and reductions in chemists' fees, have not proved sufficient.

Pharmaceutical Service

(£m.)			
1949–50*	1950–1*	1951–2†	1952–3†
35.3	39.0	43.6	47.5‡

*Actual. †Estimate. ‡Gross cost, before allowing for charge.

The following Table gives a breakdown of the cost of this service, showing how much is accounted for by chemists' fees and how much by the cost of ingredients.

Details of Cost of Pharmaceutical Service

	(£m.)	
	1951–2	1952–3
(*a*) **Payments to pharmacists**		
Dispensing fees and rota payments	13.6	13.1
Cost of ingredients and allowance for containers	24.5	26.6
Allowance for overheads and profits	3.6	6.3
(*b*) **Paymepts to doctors and dentists for drugs supplied**	1.9	1.5
	43.6	47.5

Of the gross cost of £47¼m., some £7¼m. will be paid for by the prescriptions charge. But it is interesting to note that in the debate on the charges Mr. Crookshank said that the cost of prescriptions was expected to be more than £50m. and that if the charge were introduced the estimate would go down by about £12¼m. This looks as if the Ministry of Health were counting on saving about £5m. by the deterrent effect of the charge.

Another interesting feature of the cost of the pharmaceutical service is revealed when the estimates for England, Wales, and Scotland are considered separately.

	(£m.)					
	England		*Wales*		*Scotland*	
	1951–2	1952–3	1951–2	1952–3	1951–2	1952–3
Gross cost	35.6	39.4	2.5	3.1	5.5	5.1
Less charge	—	*6.3*	—	*0.5*	—	*0.8*
Net cost	35.6	33.1	2.5	2.6	5.5	4.3

It will be seen that in England a higher estimated gross cost has been offset by the charge. In Wales, on the other hand, the charge is not enough to offset the higher cost, and there is consequently an increase in the net estimate. In Scotland, by contrast, the gross cost is actually less than in 1951–2. Does this mean that Scottish doctors prescribe less than English, and particularly Welsh, doctors? Or prescribe less expensive drugs?

Dental and Ophthalmic Services

Since the estimate for the dental service was drawn up Mr. Crookshank has announced that the age limit for exemption from the charge for dental treatment has been extended to 21 and that there will be no charge for examinations. This, he said, would reduce the amount recovered by the charge by about £1m. Presumably, therefore, the estimate will later be revised. At present the gross and net cost of the dental service is given as follows:

Dental Service

	(£m.)	
	1951–2	1952–3
Gross receipts of dentists	41.0	31.1
Less payments by patients	*4.8*	*10.9*
	36.2	20.2

Here again, as the gross receipts of dentists are estimated to drop in the new financial year, it looks as if the charge is expected to act as a deterrent.

The supplementary ophthalmic service has ceased to be a significant factor in the Health Service's finances. Its gross cost in 1952–3 is estimated at only about £11m., of which the actual cost of spectacles is estimated at nearly £4m., dispensing fees at roughly the same amount, and sight-testing fees for the balance. Receipts from patients are estimated at about £5m., giving a net cost of just over £6m.

Cost of the Hospitals

By contrast the estimated cost of the hospitals dominates the finances of the Health Service more than ever. The following Table compares the estimated expenditure on the main items of their running costs in 1950–1, 1951–2, and 1952–3. It is for England and Wales only, since the Scottish analysis of costs is on a slightly different basis.

Gross Hospital Maintenance Expenditure

	(£m.)		
	1950–1	1951–2	1952–3
Medical salaries (including specialists)	28.9	26.9	31.5
Nursing salaries	49.8	55.5	60.7
Other salaries and wages	57.6	62.7	71.7
Provisions	22.8	25.9	29.1
Drugs and dressings	8.2	9.4	10.4
Medical and surgical appliances	6.9	7.0	8.1
Fuel, light, and power	10.8	11.2	13.9
Maintenance of buildings	9.9	10.3	10.1
All other	28.4	31.9	33.5
Total	223.3	240.8	269.0

Last year some comment was made on the item "other salaries and wages." It was then broken down in some detail, and separate figures were given for ward orderlies and nursing attendants; works maintenance staff; laundry staff; farm and garden staff; administrative and clerical staff (other than for central administration); professional and technical staff; and catering officers, cooks, and kitchen staff. There remained, however, a residual item of "other staff," the cost of whom was estimated last year at as much as £22.2m. This residual item, later explained as consisting partly of porters and ward maids, has risen to £25.5m. in 1952–3.

The biggest single increase, however, in the hospitals' maintenance expenditure is accounted for by the salaries of the nursing staff. Unfortunately, this item more than any other is one which cannot be reduced if the hospitals are to maintain their services, much less expand them. But until hospital expenditure is stabilized there can be no stability in the cost of the Health Service as a whole and no confidence that the new limit—whatever it is to be as a result of the Danckwerts award—can be maintained without fresh charges.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

Attempted Suicide

SIR,—I feel sure that the chairman of the Central Ethical Committee would not desire his letter (March 22, p. 657) to lead any doctor, young or old, to imagine that his duty begins and ends only with the treatment of the medical condition from which his patient is suffering. I am unable to follow his subsequent sentence, when he refers to "whatever some coroners may say" in relation to attempted suicide. What seems to me to be important is not what coroners may say, but what Her Majesty's judges have said; in particular I would refer to what was said by Mr. Justice Avory at Birmingham Assizes in 1914. His remarks then were considered so important that they were circulated to all coroners shortly afterwards, with the authority of the then Lord Chief Justice. Mr. Justice Avory pointed out that no one would wish to see disturbed the confidential relationship which exists, and which must exist, between the medical man and his patient, in order that the medical man may properly discharge his duty towards the patient. But there are cases where the desire to preserve that confidence must be subordinated to the duty which is cast upon every good citizen to assist in the investigation of a serious crime.

The case to which the learned judge was referring was one in which a woman died as a result of an illegal operation; three doctors in succession had attended her, and to one at least she confided the name of the person who performed the act. No information was given to the police or the authorities, and the woman died without any deposition being taken, or without any statement being made by her on her death-bed which could be used in any court of law.

It will be appreciated that a case such as the above is very far removed from an attempted suicide. Speaking personally, I should have thought that the more practical view of the law was as follows. If a doctor has a patient, his primary duty is to treat the patient, and this is true even though he may think that the patient has brought about his or her own condition. This state of affairs is limited if it appears that the patient is likely to die. In such circumstances it seems to me that the doctor has the moral or practical duty, though not perhaps a legally enforceable one, to inform the police. Indeed, at an earlier stage he may have attempted to obtain from the patient consent that the police should be informed. But when the doctor finds that he is faced with something much more serious—namely, a patient whose condition and danger of death are due to the act of someone else, whether it be a murderous attack or an abortion—his public duty as a citizen can outweigh his natural and proper professional and ethical desire. Incidentally, it may be borne in mind that a woman upon whom an illegal operation is undertaken is often advised to go to hospital or to seek medical aid if, after a few days, there are any untoward signs or symptoms: on more than one occasion I have come across cases where the woman, on the advice of the abortionist, would only admit to the doctor that she had syringed herself. My fear is that some who read the chairman's letter may confuse his expression "the purposes of expediency" for what is, in fact, the law.—I am, etc.,

St. Pancras Coroner's Court,
London, N.W.1. W. B. PURCHASE.

SIR,—Dr. J. Thwaites in his letter (March 22, p. 657) quite rightly says that it is no part of the doctor's duty to act as informer to the coroner in cases of attempted suicide. Here, I think, most of us would agree with him, because we recognize that suicide is a symptom of disease that lies within our province—as a matter with which we are competent to deal. But Dr. Thwaites goes further than this. He implies in his letter that when a doctor becomes acquainted with circumstances pointing to "foul play" he should take no further action because "his duty begins and ends with the treatment of the medical condition from which the patient is suffering."

We are living in an age in which the moral standards of the community appear to be declining and now stand at a level that is appallingly low. The increase in juvenile crime is but a reflection of the moral standards of the parents, while amongst youth and adult population the level of criminal activity is such that it disgraces the civilized community in which we live. Among the most distressing of all are the accounts we read almost daily of criminal assaults on women and children. It is my opinion, and one which I believe is shared by many others, that besides his duty to his patient the doctor must realize his position as a citizen and his duty to the State. It is my contention that when in the course of his professional work the doctor comes across evidence that will lead to the detention of a criminal or the prevention or possible prevention of serious crime, it is his duty and obligation as a citizen to report such evidence to the police authorities.

I think a look at the problem from the personal angle would bring home my point. Suppose that I myself or some member of my family was the object of an assault, and that later I discover that one of my colleagues had some knowledge or suspicion through his professional contacts and had failed to take such action as would have prevented the assault, my anger and indignation against him would justifiably be roused to the extreme.

My desire for a high ethical standard in our profession is as great as any, but I believe that the occasion may sometimes arise when our ethical obligations may appear to clash with our duties to the State, but who will seriously dare to contend that the prevention of crime is no less important than the prevention of disease?—I am, etc.,

Derby. E. C. DAWSON.

Treatment of Moniliasis

SIR,—Your leading article on superinfections during antibiotic treatment (March 8, p. 537), and the interesting paper by Drs. J. D. Abbott, H. V. J. Fernando, K. Gurling, and B. W. Meade (p. 523), emphasize the growing importance of moniliasis in this new antibiotic era. It is generally agreed that treatment of *Candida albicans* infections is most disappointing. Oblath, Donath, Johnstone, and Kerr (*Ann. intern. Med.*, 1951, **35**, 97) in a review of pulmonary moniliasis agree with your editorial that treatment has been found uniformly difficult and unsatisfactory. They do not mention, however, a paper by Dr. Keeney (Ibid., 1951, **34**, 223) in which he reports the successful treatment of a case of asthmatic bronchitis, apparently due to *Candida albicans*,

with aerosols of 10% sodium caprylate in propylene glycol. Dr. Keeney had previously reported on sodium caprylate as a new and effective treatment for moniliasis of the skin and mucous membranes in the *Bulletin of the Johns Hopkins Hospital* (1946, 78, 333).

I have been unable to obtain any samples of sodium caprylate from the leading drug houses in England, and have therefore been unable to confirm his findings. It would appear, however, that research is needed to confirm these findings, which are of the highest interest. It might be useful to try undecylenic acid in the meanwhile, as this is freely available and can be used by the oral route. The cases which seem to merit a trial with this compound are those with intestinal moniliasis, with a persistent pruritus ani, which occur after prolonged treatment with chloramphenicol. We may well be ultimately disappointed in our trials, but it would appear that they are worth making.—I am, etc.,

London, N.21. E. MONTUSCHI.

Common Causes of Curable Blindness

SIR,—To cover the five main causes of blindness in 3,000 words required such compression that I am most grateful to Mr. Victor Purvis (March 1, p. 490) for his comments on my Refresher Course article (February 9, p. 318), as they permit a slight elaboration in reply.

(1) Are the visual results of iridectomy in acute glaucoma the most dismal in ophthalmology?

Here, as Mr. Purvis indicates, the date of reference is most important. In some cases patients are referred only after a period of weeks when they might more justly be described as absolute than as acute glaucoma. Apart from these, however, over half the eyes on which iridectomy was performed for acute glaucoma in my clinic in the last two years suffered from other eye diseases ranging from old corneal nebulae to macular degeneration. It is to these other conditions, as well as to the delay in referring patients, that poor visual results are due.

Iridectomy *ab externo* in the first 60 hours of "acute glaucoma *sans phrase*" gives excellent visual results as a rule.

(2) Should a cataract patient stop reading when his eyes feel tired?

A majority of senile cataracts are of cuneiform type alone, or in combination, and I have been greatly impressed by the maturation of this variety in several cases following falls. By analogy it seems possible that the movements involved in accommodation may also intensify this cataract. So dependent are both livelihood and recreation on visual effort in the sexagenarian that limitation of reading is only possible up to a point. That point, I suggest, is reached when the eyes begin to feel tired. I have never observed pure nuclear cataract (which forms 20% of the whole) to be exacerbated by indirect trauma, but it so rarely causes asthenopia that this advice occasions no restriction of use.

(3) Is general anaesthesia preferable to the almost universally employed local analgesia for cataract extraction?

In some countries patients have a prejudice against general anaesthesia for eye operations. I am told that "No me gusta el cloroformo, prefiero el aguantaformo" (I'll take *resistoform* rather than chloroform) sums up the attitude of the hospital patient in Barcelona, for example. In Britain, however, the majority of patients would, I feel sure, prefer general anaesthesia if possible, and many ask for it.

Various ophthalmic surgeons, including myself, encouraged by reports about new methods of general anaesthesia, have employed them from time to time, but have been disappointed either by residual reflex action or by their general effects on aged patients. I agree that sooner or later the improvements in general anaesthesia, the use of curarine and of detensive drugs, may supplant local analgesia for cataract extraction. But after our disappointments, like the man from Missouri, "we would have to be shown." This would require not only demonstration of the technique, but also the publication of an adequate series of cases in which the rate of operative and post-operative complications was no higher than in a similar series with local analgesia.—I am, etc.,

Leeds. JOHN FOSTER.

Combination of Congenital Anomalies

SIR,—I have read with interest Dr. I. Kessel's article (March 1, p. 470), and was somewhat surprised to observe that "no obvious anomaly of the eyes was noticed." Examination of the photograph would appear to show abnormal space between the inner canthi of the eyes, a condition which presents itself in a high percentage of cases exhibiting one or more congenital anomalies. This condition, ocular hypertelorism, shows in a particularly high number of cases of congenital oral deformity, or where oral deformity is but one of the conditions present in cases exhibiting multiple congenital defects. Dr. Kessel's mention of the palate being highly arched may have some significance, and I am tempted to suggest that some slight degree of cleft palate may have been present. It is not always easy to make an accurate diagnosis in cases where the palatal defect is sub-mucal—soft tissues intact, but failure or partial failure of bony tissue. Moreover, there would appear to be slight deviation of the nasal septum and notching of the upper lip, conditions closely associated with palatal defects.

I merely put forward this suggestion in view of my findings following examination and treatment of several hundred cases of cleft palate. In addition to the many other varied congenital abnormalities presenting themselves in these patients, the incidence of ocular hypertelorism is extremely high. I might also suggest that the presence of ocular hypertelorism may be of valuable diagnostic significance in cases of suspected congenital abnormality in infancy.—I am, etc.,

Glasgow. C. KERR MCNEIL.

Debauchery of Honest Words

SIR,—Dr. H. G. Calwell (March 8, p. 548) surely argues a poor case in his strictures on the use of the word spectrum. Originally meaning an image, especially of the colours formed by the refraction of white light, it most commonly still refers to the range of colours produced in this way. However, it is now also used to indicate the range of wavelength frequencies comprising *other* sources of wave emissions having common properties. By a change of emphasis, natural to living language, range, implied at first, has become an explicit part of the word's meaning. The usage "spectrum of antibacterial activity" appears therefore logical and legitimate: though whether it adds elegance is a matter of opinion. Dr. Calwell seems one of that band of zealots who would confine the English language to a funerary urn: often a "sad and sepulchral pitcher" at that. I do not think he will succeed until the culture of which this language is one expression has suffered a similar fate. Till then, I am for the neologism and new-coined phrase, as well as the golden periods of bygone days.—I am, etc.,

Oxford. C. W. M. WHITTY.

Congenital Absence of Rectum

SIR,—May I be allowed space to comment on the answer to the question on the treatment of absence of rectum (March 8, p. 558)? Is the gloomy prognosis which this answer suggests justified? It is true that the treatment of high rectal atresia is difficult. It is also only too true that ill-advised attempts to bring down a high rectal ampulla using the perineal approach may leave the patient with a "perineal colostomy and perhaps with a stricture." This stricture, if high (due to retraction of the bowel which has been brought down under tension) may be virtually impossible to treat.

The first step in the treatment of rectal atresia, as in other difficult surgical problems, is accurate diagnosis. It is necessary to know the level of the distal end of the hind gut and an advantage to know if there is or is not a fistulous communication with the urinary system. The estimation of the level of the bowel is made radiologically and depends upon the presence of gas in the colon. It has been shown that gas usually reaches the distal colon within six hours of birth.

In all cases it should be the aim of the operator to leave the patient with a normally situated anus and to ensure him continence of faeces.

The perineal approach should be reserved for cases of imperforate anus where the perineal skin and wall of the rectal ampulla are practically in apposition. For all other cases a synchronous combined abdomino-perineal operation is required. It is rarely necessary, and usually inadvisable, to do a preliminary colostomy. Continence after the abdomino-perineal operation for high rectal atresia does not depend upon the external sphincters, which are absent in all but the mildest of anomalies, but on careful preservation of the pubo-rectalis sling of the levator ani.

In my small series of six cases, the children who are old enough to assess have normal bowel action and are continent of faeces but probably not of flatus. In one child, owing to an error in technique, the operation failed and a colostomy, which it is hoped will be temporary, was performed at the age of 6 months.

I understand that a similar type of abdomino-perineal operation is being practised for high rectal atresia in several centres in Britain and the United States and that the results are satisfactory.

Two important points cannot be too emphatically made: (1) If a colostomy is performed it should be a transverse colostomy so that adequate distal colon is available for a later abdomino-perineal operation. (2) The diagnosis of high rectal atresia should not be made by exploration of the perineum. Extensive dissection results in the pelvis filling up with scar tissue, which makes later attempts to bring down the colon extremely difficult.—I am, etc.,

Liverpool. ISABELLA FORSHALL.

Sickle-cell Trait in the Newborn

SIR,—I read with interest the article on the sickle-cell trait in Western Nigeria by Drs. D. B. Jelliffe and John Humphreys (February 23, p. 405). In a recent survey in the Accra district of the Gold Coast the blood of 71 (18.4%) of 384 neonates and 75 (18.2%) of 413 mothers exhibited the sickle-cell trait. The percentage of cells sickling in the newborn was, however, small (0.3–48%). The number of sickled cells was found to increase in the six babies followed up over 10 weeks. It should be noted that the rapid bacterial method (Robinson, *Trans. R. Soc. trop. Med. Hyg.*, 1945, **39**, 264) was utilized to detect the trait. Watson (*Amer. J. med. Sci.*, 1948, **215**, 419) reported that the incidence of the sickle-cell trait in newborn babies and mothers was similar, and noted the low percentage of sickled cells in the babies. This percentage was found to increase with age. The apparent absence of the sickle-cell trait in the 51 newborn babies examined by Drs. Jelliffe and Humphreys might be explained by the method they employed to detect the trait, as the slow coverslip method may on occasion fail to reveal sickling in adults (Edington, *E. Afr. med. J.*, 1950, **27**, 185). It is possible that the small percentage of erythrocytes sickling in the newborn could thus be missed.—I am, etc.,

Accra, Gold Coast. G. M. EDINGTON.

Left Hand, Right Hand

SIR,—As I read your annotation entitled, "Left Hand, Right Hand" (March 15, p. 591), the monkey now stands revealed as exhibiting an inborn cerebral dominance which gives it a lateral handedness, but without the human bias towards the use of the right hand. To my mind this raises the issue whether man is truly the right-handed being that we have always been so happy to suppose; in fact, whether it is not the case that the initial endowment has always been the same for man as for monkey.

There is nothing racially discreditable in this. Originally it was mere mediaeval prejudice that dubbed the sinistral a clumsy and perhaps shady member of society; this although I recall one Eton *v.* Harrow match where 13 of the 22 players were left-handed. Next, with the pin-pointing of the speech-centre in the left hemisphere, came the pretty theory that man needed it there so that he could the better add a vocal obbligato to his successes with the right hand.

To-day I venture to suggest that the main influences we are recording when we test for right-handedness are the school pen, the dinner-knife, and the tools of the various competitive sports. So much so that dextrality itself has surely become an obsolete criterion of cerebral dominance.

Now that the discovery of a fresh fundamental has shaken the old superstructure, what we need is a new census of cerebral dominance itself. To begin with, it should cover word aptitude in its widest sense, and record physical aptitude in all its components. Thus it should not overlook, among others, those who are right-handed for pen but left-handed for such actions as brushing the teeth or dealing at cards, not to mention those who remain left-footed or left-eyed for telescope and keyhole. In doubtful cases account should be taken of the manner of mounting a horse, a bicycle, a ladder, or again of taking off for a jump. As a final test the candidate should be asked to show his method of digging a spade into the ground, since this affords no fewer than four possible combinations of the three limbs used in its performance. When all this has been done, and not before, the left-handed among us may emerge from physiological disgrace. Until then only the monkey stands out with any distinction.—I am, etc.,

Richmond, Surrey. JOHN DANCY.

Treatment of Hypoprothrombinaemic Haemorrhage

SIR,—In his letter (March 15, p. 603), Dr. H. Lempert would appear to take exception to the conclusions drawn by us in our paper (February 23, p. 412), in which we compared the effect of vitamin K_1 and the synthetic vitamin-K analogues in reducing the prothrombin times in patients receiving dicoumarol or "tromexan." He criticizes us in that we had no opportunity for therapeutic trials of the vitamin-K preparations in patients actually suffering from overdosage with these anticoagulants. In a well-conducted hospital such therapeutic misadventures are rare events, and, as he points out, the natural course of such emergencies varies widely in different patients. A large series would therefore be necessary for an adequate clinical evaluation of the various vitamin-K preparations. It is to be hoped that opportunities for such a trial will seldom be available to us or to anyone else. Since our experimental data indicate that vitamin K_1 is more effective than the synthetic analogues in reducing the prothrombin times in patients receiving therapeutic doses of anticoagulants, it seems to us not unreasonable to conclude that this substance will also prove more effective in the management of a patient suffering from an overdosage of these drugs.

Dr. Lempert goes to some length to emphasize that when haemorrhagic complications occur in patients receiving anticoagulant therapy they may recover following withdrawal of the anticoagulant drug and the administration of a vitamin-K analogue, but, if the complication is severe and a vital centre is affected, then no form of therapy is likely to be of avail. Being not entirely uninstructed in the basic principles of pathology, we regard this merely as a glimpse of the obvious. We do, however, disagree with the doctrine of predestination to which Dr. Lempert apparently subscribes—that in some extraordinary manner haemorrhagic complications are necessarily trivial or fatal from their commencement. It is widely recognized that in mild cases spontaneous recovery will often occur on withdrawal of the anticoagulant drug, but we question whether there is any satisfactory evidence that the administration of a synthetic vitamin-K analogue is a reliable therapeutic measure in correcting an unduly prolonged prothrombin time. Dr. Lempert's own contribution, to which he refers, fails to provide any valid support for his contention. On the contrary, it shows most effectively that good fortune rather than effective treatment provided a favourable outcome. His patient, suffering from dicoumarol overdosage (prothrombin level, 9%), was given 300 mg. "synkavit" intravenously daily for five days. At the end of that period, and seven days from the last dose of dicoumarol, the prothrombin level was no higher than 37%.

Finally, regarding the administration of the vitamin K_1, we would refer Dr. Lempert to our paper. We took a half to five hours (not five and a half hours as he misquotes) to give the selected doses, the longer times being dictated by caution

in the early trials. Although vitamin K_1 is more troublesome to administer than the synthetic analogues, this is surely a minor consideration if it is likely to be more effective as a measure in saving the lives of even a few patients.—We are, etc.,

ALEXANDER BROWN.
A. S. DOUGLAS.

Glasgow.

Nailing the Femoral Neck

SIR,—I was interested to read Mr. D. O. Williams and Mr. E. K. McLean's article on fractures of the femoral neck (March 15, p. 580). There are two points in the treatment of these cases that I think should be emphasized.

First, in my opinion, Leadbetter's method of reduction is too severe. Restricted gentle movements of internal and external rotation are sufficient. Secondly, I think that these fractures should be nailed in a few degrees of external rotation rather than internal rotation.

I have discussed the reasons for using these two movements elsewhere (*Postgrad. J.*, Overseas Edition, 1948, 2, 456). There is not space in the course of a short letter to do more than mention the fact that they have been responsible for a marked improvement in my results.—I am, etc.,

F. P. FITZGERALD.

London, W.1.

Nature Cure

SIR,—Dr. F. M. Lehmann's letter (March 22, p. 653) refers to a fundamental issue. I agree with him that Nature Cure is based on principles which have in the past been part of medicine as taught in the medical schools. I also agree that vitalistic conceptions are indispensable in medicine of any school. My point is that Nature Cure has got something which present-day orthodox medicine has not got but should have. Nature Cure scores over orthodox medicine by concentrating upon people's habits of life as determining disease: their food and drink, their stimulants such as tea, coffee, alcohol, and tobacco, their drug-taking, their exercise or lack of it, their degree of exposure to sun, air, and water. Nature Cure encourages people to modify their mode of life to prevent or cure disease. It condemns artificiality wherever it can be avoided, whether in the shape of chemical fertilizers for the soil or all unnatural and over-refined and adulterated foods such as white flour and sugar. Its treatment consists in grading the stimuli of diet (fasting being the most drastic one), of water (the temperature of the water and the size of skin area being the factors to be varied in grading), of air and sun. This, as Dr. Lehmann says, is unspecific treatment. It is not out of date and need not be part of a metaphysical, dogmatic, fanatical, or superstitious *Weltanschauung*. Its incorporation into medicine would greatly improve the physical and mental health of the population and ease the economic crisis with which we are faced.—I am, etc.,

E. K. LEDERMANN.

London, W.2.

Megaloblastic Anaemia in Indians

SIR,—The correspondence on this subject (January 26, p. 220) suggests that this is a disease entity with limited aetiological factors. Great differences of opinion have been expressed on the value of vitamin B_{12}, folic acid, and liver extract.

Is not the whole subject of tropical macrocytic anaemia infinitely complex, expressing a picture of unlimited combinations of protozoa and nematodes competing for protein with physiological states of pregnancy and lactation, to which other competitors such as tuberculosis, syphilis, and dietary imbalance are frequently added?

It is almost beyond statistical methods to plan an experiment in which two series of cases can be called comparable. This is being tackled here, but the first year's work does nothing but indicate that another 10 years are required to clarify the subject. A few suggestive findings have emerged.

(1) A man suffering from hookworm infection may have a moderate microcytic hypochromic anaemia.

(2) A woman similarly infected quite often has a megaloblastic anaemia.

(3) Both will respond to the specific worm treatment.

(4) Vitamin B_{12} or folic acid will hasten the female recovery, but both will fail or succeed briefly if the worm treatment has been inefficient.

(5) Children with heavy ascaris infections not uncommonly have megaloblastic anaemias. Ascaris is a large worm occupying important absorption areas, and as the fish tapeworm appears to cause this type of anaemia through its size and position there is possibly an analogy. It is not rare for a child of 2 years to pass 50–100 worms on long "hetrazan" treatment (6 mg. per kilo of body weight three times a day for 14 days). A child of 6 months has passed nine.

It is of course a gross simplification, but megaloblastic anaemia probably does not arise from one cause or a single defect but by deviation of protein and specific erythropoietic substances from the main line: small intestine—liver—bone marrow.—I am, etc.,

P. H. BIRKS.

Beesakopie, Upper Assam.

Congestive and Simple Glaucoma

SIR,—Mr. S. J. H. Miller's study in contrasts (March 1, p. 456) I regard as valuable, chiefly because it emphasizes the fact that the varieties of glaucoma by far the most commonly met with, which he includes under the heading simple glaucoma, are relatively free from characteristic signs and symptoms, and therefore may remain unsuspected until a large area of the visual field is lost.

His statement, however, that true glaucomatous field changes can co-exist with a normal optic disk should not in my opinion remain unchallenged. Not only do I venture to question the validity of this statement, but also feel that if accepted it might readily give rise to serious errors of diagnosis.—I am, etc.,

R. AFFLECK GREEVES.

London, W.1.

Treatment of Tropical Ulcers

SIR,—In the interesting article on the "Treatment of Tropical Ulcers" by Mr. H. D. Obrien (December 29, 1951, p. 1544) the impression is given, under the heading "Local Treatment," that potassium permanganate 1/1,000 was the only treatment recommended by me for that class of ulcer. This is not so, for the title of my paper (*Trans. roy. Soc. trop. Med. Hyg.*, 1944, 37, 346) indicates clearly that a kaolin-acriflavine powder was the basic element of the treatment.

The permanganate was used solely for irrigation, as a preliminary cleansing and deodorizing agent, which by washing away and oxidizing the acrid tissue-liquefying discharges contributed in no small degree to rendering the ulcer less painful, and thereby adding to the patient's comfort after dressing.

The treatment was adopted during the war because of the extreme scarcity of material such as hospital cotton-wool, lint, and liquid paraffin for the preparation of Z.I.P. It consisted in irrigation with warm permanganate lotion, thickly dredging with A.K. powder prepared, as described in my paper, from local deposits of kaolinitic earth and soluble acriflavine tablets, the superimposition of jaconet or lint smeared lightly with vaseline to prevent sticking, a pad of raw ginned cotton, and the application of a calico bandage. The dressing was left on for at least 24 hours at a time. As regards irrigation, a number of cases can be dealt with rapidly by boiling the requisite quantity of permanganate in a 4-gallon paraffin tin, standing it on a paraffin box, and, while the lotion is still warm, siphoning it off with rubber tubing as required per patient. Any dresser could learn the method in a few hours.

Surely a simpler, cheaper, less time-absorbing method can hardly be looked for? What is more, it is effective. There is, therefore, so far as I am concerned, no question of "these methods requiring the attention of trained dressers several times a day and fairly large amounts of dressing being used."—I am, etc.,

J. O. SHIRCORE.

Fort Johnston, Nyasaland.

Malaria

SIR,—I have followed with much interest the correspondence on this subject which has been appearing in the columns of your *Journal*. In the first place I would emphasize that the following remarks apply only to my experience in this locality, as I have not practised in any other part of Kenya or the Tropics.

I arrived here nearly 16 years ago and found that the two resident practitioners (one at least of whom had practised in Kenya for 30 years) usually treated an attack of malaria with intramuscular injections of quinine, a common routine being 10 gr. a day for six to twelve days. This rather horrified me, being imbued with the accepted teaching that intramuscular quinine was to be used only in emergencies. However, it did not take me long to find out that my patients responded very tardily or not at all to quinine by mouth. It may be that the local (mainly farming) community cannot be cajoled or coerced into staying in bed for two weeks during oral therapy, but that is not the whole reason.

It soon became apparent that the most reliable and most rapid, and often the only, way of curing the malarial attack was by parenteral therapy. Since those days, when "atebrin" was first being tried out, I have tried every method of oral treatment possible, varying the dosages, length of treatment, different combinations of drugs (including the arsenicals)—but excepting atebrin plus "pamaquin," which gives rise to very severe abdominal colic—up to and including chloroquin, and also trying fewer injections followed by a course of the drug or drugs by mouth.

As a result I have come to the conclusion that the only reliable method of curing the malarial attack consists in a daily intramuscular injection of quinine for six days (in rare instances eight or twelve may be necessary), or six deep intramuscular injections of mepacrine (0.3 g. each) over a period of eight days. In both instances the dose is dissolved in 10 ml. of sterile water. I prefer quinine as being less painful, and also mepacrine occasionally gives rise to temporary mental disturbance.

The fear of abscesses and nodules is, I think, exaggerated. If the dose is given diluted as above (1 gr. quinine per ml.), in sterile water, deeply (I invariably use the full length of a 2-in. (5-cm.) needle in any subject over 5 years old), nodules are rare and abscesses almost unknown, with ordinary aseptic technique. I have given literally thousands of injections of quinine in the last 15 years, with only two abscesses, and both these occurred in one week during the war years and were due to a misunderstanding whereby the water used for dilution had not been boiled but only warmed.

The only disadvantage that I know of in deep intramuscular therapy is that the injection is apt to be temporarily painful, and I have found that even this is much reduced and the local reaction lessened by using a proprietary preparation of quinine ("solvochin"), which I have used for the last three years, in which the highly acid quinine bi-hydrochloride is reduced to a *p*H value of 7.2. This is also best used diluted. This is naturally particularly acceptable to children, who dread the injections of ordinary quinine.

Contrary to the experience of Cooke and Wingfield (*Lancet*, 1944, **1**, 804), who used two or three injections of 2.2 ml. "solvochin" daily, I find it rarely necessary to give more than one injection per day.

—I am, etc.,

Eldoret, Kenya. H. L. PEAKE.

Polyarthritis with Pulmonary Signs

SIR,—The interesting article by Dr. A. W. Lees (February 2, p. 246) raises once again the controversial issue of the relationship between acute rheumatic fever, rheumatoid arthritis, and other allied conditions or variants. As the underlying cause of all these conditions is still unknown, the answer to such a problem must remain *sub judice*. After reading Dr. Lees's article I was reminded of a somewhat similar case which I have recently attended.

The patient, a woman aged 59 years, had rheumatoid arthritis for seven years. She was admitted to hospital in December, 1951, with a bilateral pulmonary lesion, similar to that described by Dr. Lees. A small quantity of straw-coloured fluid was removed from the left pleural cavity. The arthritis was extremely active, and all the affected joints were swollen, red, and exquisitely tender on palpation. She was sweating profusely and her temperature varied between 103° F. (39.4° C.) and 98° F. (36.6° C.). The erythrocyte sedimentation rate was 82 mm. in one hour (Westergren). I was impressed on this occasion, as upon other occasions, by the marked discrepancy between the physical signs in the lungs and the radiological findings. Pneumonia, associated with the rheumatic diseases, produces gross physical signs—dullness to percussion, pleural friction sounds, an abundance of clear, fine, and medium crepitations, and possibly signs of effusion, and yet a radiograph of the chest may only reveal apparently small basal areas of consolidation bearing no close relationship to the large area of involvement which can be mapped out on the chest wall. Penicillin and salicylates had no effect upon her pyrexia or pulmonary lesion, but the latter drug did relieve her joint pains and swelling to a considerable extent. After two weeks in hospital a deterioration in her condition was noted, and on examination a triple heart rhythm and pericardial friction rub were audible. Six days later a violaceous rash appeared on both upper limbs and over a considerable area of her back. The E.S.R. rose to 124 mm. in one hour (Westergren), and it was considered that her "rheumatoid disease" had undergone a mutation into disseminated lupus erythematosus. However, the rash had completely disappeared within one week of its appearance, and the patient steadily improved. After 30 days had elapsed she was apyrexial and no longer complained of severe pains in her joints. Physical signs in the lungs indicating consolidation were unchanged.

Here, then, is another example of polyarthritis with pulmonary consolidation and pleural effusion. I consider that the case which I have briefly described is an abortive example of disseminated lupus erythematosus, and would emphasize the striking similarity between this condition and the reaction-pattern associated with rheumatoid disease as defined by Ellman and Ball (*British Medical Journal*, 1949, 2, 816).

The simultaneous involvement of so many joints in Case 1 described by Dr. Lees, together with a severe systemic upset and a pulmonary lesion (bilateral in Case 2) yet no apparent cardiac lesion, suggests that this case may represent another mutation lying somewhere between acute rheumatism on the one hand and disseminated lupus erythematosus on the other. I consider that it is of some importance to recognize the possibility of such a mutation occurring, as this may explain why, in my experience, the occurrence of pulmonary manifestations with acute polyarthritis frequently heralds a gloomy prognosis.—I am, etc.,

Birkenhead. T. R. LITTLER.

Generalized Osteoarthritis

SIR,—In their article on generalized osteoarthritis and Heberden's nodes (January 26, p. 181), Drs. J. H. Kellgren and R. Moore state, "We have been able to define a distinct clinical entity for which we suggest the name of primary generalized osteoarthritis." An excellent description of this condition was published in Nelson's *Loose-Leaf Living Medicine* about 1936. It did not mention involvement of the carpo-metacarpal joint of the thumb, but this was described in the *Medical Annual* of 1938. The syndrome of generalized osteoarthritis was also described briefly at the plenary session of the Australasian Medical Congress in 1950 (*Med. J. Aust.*, 1950, 2, 77).

Drs. Kellgren and Moore state, "The pain acquires a characteristic burning, tingling, and bursting quality, and the patients place their hands outside the bed to obtain relief." Here I think they are ascribing to osteoarthritis of the finger-joints the symptoms of acroparaesthesia, which is a frequent accompaniment of osteoarthritis but may occur in its absence. Acroparaesthesia recovers, at least temporarily, if the patient goes on a holiday, while more permanent relief is obtained by prescribing dienoestrol 3 to 6 mg. daily. The small doses used by Drs. Kellgren and Moore are, I agree, ineffective.

Of the radiological signs of osteoarthritis of the spine, Drs. Kellgren and Moore state, "The articular facets and the neural arches, including the spinous processes, become enormously enlarged and sclerosed, so that 'kissing spines' are often seen." Before I would accept this statement I would ask Drs. Kellgren and Moore to inform me: (1) What is the size of the normal articular facet? (2) What is the size of the normal spinous process? (3) How does osteoarthritis of the interlaminar joint cause enlargement of the spinous process and the neural arch?

The radiological signs of osteoarthritis of the interlaminar joints are the same as those of osteoarthritis elsewhere—namely,

thinning of a joint at first and lipping of its margins later. Thinning of an interlaminar joint is wellnigh impossible to demonstrate, and lipping, except in the upper cervical region, is rare.

Generalized osteoarthritis is often associated with spinal osteoporosis. In a lateral radiograph of a normal spine the vertebral bodies appear white and the spinous processes grey. In spinal osteoporosis decalcification affects first the vertebral bodies, which then appear grey and of the same photographic density as the spinous processes. This appears to be the case in the radiograph of the lumbar spine published by Drs. Kellgren and Moore. In osteoporosis, too, there is usually some lordosis. As a result, the size of the spaces between the spinous processes is diminished; hence the appearance of "kissing" spinous processes. By contrast with the narrow spaces between them, the spinous processes appear to be enlarged.

In conclusion, I would submit that generalized osteoarthritis is a disease occurring especially in females over the age of 40 and affecting especially the terminal and later the proximal interphalangeal joints, the carpo-metacarpal and the metacarpo-phalangeal joints of the thumbs, the knees and hips, and the metatarso-phalangeal joints of the great toes. The interlaminar joints are often affected pathologically, but clinically and radiologically they seldom seem to be affected except in the upper cervical region. Generalized osteoarthritis is often accompanied by acroparaesthesia and by spinal osteoporosis. Backache, when it occurs in association with generalized osteoarthritis, is often relieved by the administration of oestrogens and calcium, and this suggests that it is due to osteoporosis and not to osteoarthritis. The cause of generalized osteoarthritis, acroparaesthesia, and spinal osteoporosis will perhaps be found in the relationship of generalized osteoarthritis to the menopause, the relief of acroparaesthesia by large doses of oestrogens, and the alteration of a negative to a positive calcium balance in osteoporosis by the administration of oestrogens.—I am, etc.,

Mt. Hawthorn, W. Australia. JAMES H. YOUNG.

Tenosynovitis

SIR,—In the treatment of acute and chronic non-specific tenosynovitis there is no mention in the Refresher Course article by Mr. D. Ll. Griffiths (March 22, p. 645) of the routine treatment as carried out in some of our hospitals and clinics. If deep friction as advised by Cyriax (*Rheumatism and Soft Tissue Injuries*, J. Cyriax, 1947) is undertaken in these cases, all other forms of therapy can be dispensed with, to the greater satisfaction of the patient and the doctor. I now tell my patients in general practice what to do and how to do it, advising them to get a relation to perform the deep friction.—I am, etc.,

Ryde, I.W. T. HAMBLY.

Family Planning

SIR,—It is unlikely that anyone will find fault with this memorandum (March 15, p. 595), which, so far as it goes, is a perfectly satisfactory document. On the question of women seeking advice, we are told that they are those who on medical grounds have been advised to avoid pregnancy, and secondly that there is a group of women who wish to plan their family with intervals between the birth of the children. Now it seems to me that nowhere in this memorandum is it suggested that the post-natal clinic would be the place to carry out this practice. The obstetrician, with his notes in front of him, can see if the patient has had hypertension, cardiac disease, renal disease, etc. He will know if it is advisable for this woman to have more children or not, and he is the person to fit the patient then and there with some contraceptive appliance and to see that she is instructed in its use. Similarly with the patients who have had two or three children in rapid succession and who look tired and anaemic, etc.

It is always somewhat surprising to me to have to set up special clinics for contraceptive advice when clinics exist but are not being used.—I am, etc.,

London, S.E.3. KEITH VARTAN.

Familial Erythema Nodosum

SIR,—The account given by Mr. John Fry (March 8, p. 529) of erythema nodosum affecting three members of a family emphasizes the danger of open tuberculosis in the home to a young family. In an article on the aetiology of erythema nodosum (*Brit. J. Derm. Syph.*, 1936, **48**, 123) I recorded a similar occurrence of five cases of erythema nodosum in a family of eight children. The cases were admitted to hospital within a week of each other. A month previously one of the family, aged 18 years, had a haemoptysis and a widespread infiltration of one upper lobe. One child, aged 6 years, with erythema nodosum showed an opacity in the lung and enlarged hilar glands and subsequently developed tuberculosis of the lung. Another child, aged 16 years, also had enlarged hilar glands and two months later developed a small opacity in the lung with increase in the size of the glands.

It is vital to regard erythema nodosum in children as a manifestation of early tuberculous infection unless proved otherwise. These children should be kept under close observation for a period of a year.—I am, etc.,

London, W.1. L. FORMAN.

Intra-articular Streptomycin

SIR,—I was interested to see the article by Dr. R. T. Ahern and Mr. G. P. Arden (March 1, p. 466). My own work on intra-articular penicillin has been followed by a study of the intra-articular use of streptomycin. After injections of 1 g., streptomycin may be recoverable from the joint for at least a week, and after five or six injections has been found to persist for a much longer period, often over six weeks. Local assay is possible only by joint washing, since effusions tend to dry up rapidly after the first few injections. If injections are given into joints at weekly intervals it is probably necessary to use streptomycin intramuscularly as well.

Ahern and Arden have followed up their cases for a "fairly short" period (average 20.4 months). To a student of tuberculosis, any conclusions drawn from such a short period of observation would obviously be worthless. I would like to issue a word of warning. Two of my cases followed up for over three years have suffered reactivation with serious bone involvement, although at two years they were apparently doing well and gaining mobile joints. I am glad to see that the authors use the methods of conservative treatment in association with streptomycin. There are, however, dangerous experiments being carried out in other centres where immobilization and general treatment are being neglected. Streptomycin may enable us to shorten our period of treatment, but should be used only as an adjunct to the well-tried methods that our experience has taught us to adopt in the past.—I am, etc.,

Exeter. G. BLUNDELL JONES.

Tooth in Tonsil

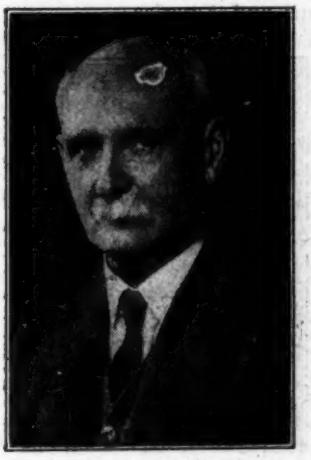
SIR,—Foreign bodies embedded in the tonsil are sufficiently rare to warrant recording. I have just seen a 16-year-old girl who was referred to me because of the presence of something hard in the tonsil. This had caused no discomfort, but the patient had noticed something unusual about the right tonsil when she was looking at her throat in the mirror. On examination, a greyish mass was seen at the site of the opening of the crypta magna of the right tonsil. This was hard and brittle to the touch. The mass was removed and found to be a rough concretion about ½ by ½ by ½ in. (1 by 1.3 by 1 cm.), in which was embedded a primary incisor tooth. Neither the patient nor her mother could remember any incident in which a primary tooth could have been lost.—I am, etc.,

Liverpool G. A. MOULDEN.

Obituary

Sir LEONARD HILL, LL.D., M.B., F.R.S.

Sir Leonard Hill, whose death on March 30 we regret to announce, held a distinguished place among British physiologists. For 17 years he was director of the Department of Applied Physiology and Hygiene at the National Institute for Medical Research, during which he took a leading part in the investigation of many problems concerning the human body in its reaction to temperature, air currents, and solar rays, and he not only supervised but inspired the work of many others. Apart from his official appointments there and in the University of London, his work ranged over a wide field.



[Elliott and Fry, Ltd., London

Leonard Erskine Hill was born in 1866, the son of Dr. G. Birkbeck Hill, a well-known authority on Johnson and other literary figures of the eighteenth century. Sir Rowland Hill, of penny-post fame, was his great-uncle. The boy was sent to Haileybury, and afterwards to University College, London, where he became Sharpey research scholar and assistant professor of physiology. His first book, on the physiology and pathology of the cerebral circulation, was published when he was only 30 years of age. The first decade of the twentieth century found him working at London Hospital Medical College, where he held his university chair as professor of physiology. He was also lecturer on physiology at Oxford. He was elected F.R.S. in 1900.

In 1914 he began his work at the National Institute at Hampstead, where he remained until 1930. During this period he made a noteworthy report to the Medical Research Council on ventilation and open-air treatment. One sphere in which he carried out some useful work was the ventilation of the House of Commons. He wanted to be sure, as he said on one occasion, that the Members did not suffer from cold feet and hot heads. Another institution which interested him was the new monkey-house at the Zoo, where the animals were given warm shelves, incandescent lamps, "vita-glass" skylights, louvres open to the roof, and free access to open-air playgrounds, as well as food rich in vitamins. In describing all this he added, with a touch of his sardonic humour, that if these conditions were provided for children in cities we should raise an A1 population. Another subject to the knowledge of which he largely contributed was caisson disease and divers' palsy, on which he wrote a paper for this journal in 1912. The katathermometer which Leonard Hill devised records not only the effect of the temperature of the surrounding air on the cooling of its surface when at body temperature but of the wind and any movement of the air, and also how quickly cooling takes place when its surface is wet, as the skin is during perspiration. It was used for observations by the National Fatigue Board in a number of trades to help to ensure the efficiency and comfort of the workers.

Hill carried out extensive researches on solar radiation. The results of these are embodied largely in his book *Sunshine and Open Air*, in which he gives the results of investigations on the ultra-violet radiation reaching various levels of ground. One of the principles on which he always insisted was that wind and movement of air were far more important than temperature in the cooling of the body. He may have coined the term "aerotherapeutics"; at all events he wrote the article under that title in the *Encyclopaedia Britannica*; and in the same work he wrote the article on light and radiation in relation to health. At one time great interest was taken in ozone, which was supposed to have marvellous properties: Hill's view was that the only use of ozone was for deodorizing offensive smells.

Among his other official work was his membership of the Army and Navy Medical Advisory Boards and the Medical Administrative Committee of the Air Board (now the Air Ministry). He was Oliver Sharpey lecturer to the Royal College of Physicians, Hunterian Professor to the Royal College of Surgeons, a member of the senate of the University of London, an honorary associate of the Royal Institute of British Architects, and President of the Association of Sanitary Inspectors. He was a Fellow of University College, London, and LL.D. of Aberdeen. He was a member of the British Medical Association and until his death a regular reader of the *Journal*, contributing to its correspondence columns forthright views on the many topics that interested him. At the centenary meeting of the Association in 1932 he was president of the Section of Physical Medicine. He was knighted in 1930.

After his retirement from the National Institute he became director of research at the St. John Clinic and Institute of Physical Medicine. He also devoted himself largely to writing, and his publications include a *Manual of Physiology* and works on such subjects as the common cold, ultra-violet ray treatment, the science of ventilation, and health and environment. He was co-editor of *International Medical Monographs*, a New York publication. He contributed many papers to the physiological journals and the *Transactions* of the Royal Society, of which body he was elected a Fellow. He was the second recipient—the first having been Lord Rutherford—of the T. K. Sidey memorial medal and prize, given by the Royal Society of New Zealand to the person who, in the opinion of the council of that body, had made a valuable contribution to human knowledge by original research into the effect of light and solar radiations on human comfort. The award was instituted to commemorate the passing of the Summer-time Act by the New Zealand Parliament.

The appearance of Leonard Hill as well as his words preached the gospel of sunshine and the open air. He seemed always to suggest in his person the peak of physical well-being. His speech was incisive and he was inclined to be dogmatic, and in his laboratory and lecture theatre he could be rather forbidding. But his Buckinghamshire home at Chalfont St. Peter revealed him in a different aspect. He had a remarkable talent as a painter of landscape and animals. He was also a writer of fairy stories, one volume of which, called *The Scarecrow*, was published in 1927, and followed four years later by *The Monkey Moo Book: Tails Which Fit Little Children*, which was illustrated by his

own pencil. His *Philosophy of a Biologist* sums up his reflections on what life and his studies had taught him. It is a work which would not please the orthodox Christian, nor, indeed, the upholders of any religious dogma, but he declared that modern science had brought us to the conception of a power, eternal, infinite, unknowable, "a power equivalent to the purest conception of God stripped of all dogma and superstition." To him metaphysics, creeds, and spiritualism were barren things. Upon spiritualism in particular he poured immense contempt, regarding all mediums as charlatans, and all sitters as victims of credulity. His own faith and certainty were that scientific knowledge can extend life and happiness.

He married in 1891 Janet Alexander, and had two daughters and four sons, one of whom, Dr. A. Bradford Hill, is professor of epidemiology and vital statistics at the London School of Hygiene and Tropical Medicine.

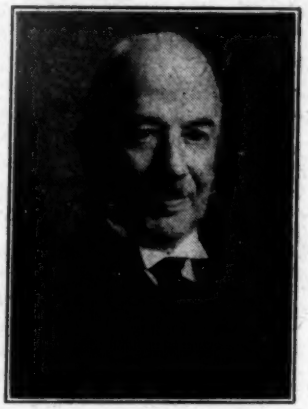
We are indebted to Mr. H. B. Walker, F.R.C.S., for the following appreciation: It may not be out of place at the termination of a long and distinguished life to recall some minor memories of it in its prime. The setting would be Leonard Hill's physiological laboratory at the London Hospital, and he would be in the early years of his fifth decade. To one who had been of his students, and was then a very junior demonstrator, he at first seemed a rather shy man, and even a little unapproachable. But his broad and genial humanity soon became perceptible, illuminated by the warm affection of his colleagues and assistants, notably Major Greenwood, Martin Flack, and Alun Rowlands. He was a man of long silences, seeming to be pondering deeply upon the physiological problem of that particular hour, which he always chose to attack by the path of simplicity in method and equipment. His outlook on life seemed to be rather quizzical. There was always a glint of humour flickering in his eye, and when one came under his immediate scrutiny it always seemed to register a mild astonishment that any such strange physiological phenomenon as oneself could possibly exist. He had a habit of keeping on his desk some volume of the classics. Rabelais was an especial favourite, and he was fond of selecting and reading out passages which seemed apposite to the contemporary social, political, or even physiological scene. He was a kind, wise, and sympathetic teacher by personal contact and at the laboratory bench, but as a lecturer to the syllabus he was scarcely inspired. Like most men of research, he was slightly bored by this routine work. He was clear, simple, and precise, but his delivery became monotonous and his diction dull. In this he was a great contrast to his colleague, Major Greenwood, whose brilliant expositions were so bejewelled with dazzling phrases that the mental eye was often momentarily blinded to the main pattern of his theme.

The "Chief," as we called him, had a fund of dry humour, and there were two especial stories that he was wont to tell against himself, one of them with rather a macabre turn. It was his daily habit throughout the year, in all weathers, to take an early morning bathe in some pond near his home at Loughton. One bitter day as he was poised for the plunge he heard a passing carter say, "B—— old fool." Leonard remarked that it wasn't the "B——" or the "fool," but the "old" that cut him to the quick. On another occasion at this same place he found a handsome umbrella which, no owner being forthcoming, he took home. Some days later in his swim he encountered a floating object which turned out to be a human body. At the subsequent inquest the deceased's wife was asked if she had recovered all his clothing and effects. "No," she answered. "What was missing?" "His umbrella." "Had she not seen it since his death?" "Yes." "Where?" "That gentleman over there has it in his hand." Leonard Hill, with not unusual absence of mind, had brought it with him to the inquest.

It is not the intention, nor is it within the competence, of this brief memoir to assess the value of Leonard Hill's contributions to physiology. It may suffice if it can recall and record some of the lesser things in the life of a great-hearted gentleman who loved in equal measure science and humanity.

EDWIN BRAMWELL, M.D., F.R.C.P., F.R.C.P.Ed.

Professor Edwin Bramwell died at his home in Edinburgh on March 21 after suffering for many years from a painful arthritic illness, borne with great fortitude and courage. Despite his crippling disability he remained mentally active and took a great interest in all matters connected with the Edinburgh Medical School, especially the development of postgraduate teaching. Over a long period of time he was one of the leading consulting physicians in Edinburgh and a distinguished neurologist, well known throughout Europe and America.



[Drummond Young, Edinburgh.

The eldest son of the late Sir Byrom Bramwell, described by the late Sir James Purves-Stewart as the Nestor of the profession in Edinburgh, Edwin Bramwell was born on January 11, 1873, in North Shields, and was educated at Cheltenham College, as his father was before him. He studied medicine at Edinburgh University, where he graduated M.B., Ch.B. in 1896. After graduation he lost no time in training himself for the work of a consulting physician: he spent a year in Germany and Paris, and held house appointments at the National Hospital, Queen Square, London, before he returned to Edinburgh to begin his life's work as a teacher and consultant. He became a Fellow of the Royal College of Physicians of Edinburgh, in 1903, and obtained the Fellowship of the sister College in London in 1907. For some years he was associated with his father in teaching systematic medicine to large classes in the School of Medicine of the Royal Colleges.

His war work, during the years 1914 to 1918, was conducted at the 2nd Scottish General Hospital, where he was in charge of a medical section, as well as being neurologist to this hospital and to another in the neighbourhood for the treatment of shell-shocked patients. For his Morison Lectures, in 1917 and 1918, to the Royal College of Physicians of Edinburgh he took as subject "War Neurology." At the same time he was engaged on an extensive clinical study of encephalitis lethargica, which he embodied in his M.D. thesis, being awarded high commendation. After having been an assistant physician for 15 years, in 1919 he was appointed physician to the Royal Infirmary, where he remained till 1934, retiring at the age of 61 to allow more time for private practice. His work at the Royal Infirmary was much appreciated by the managers, and in their minute regretting his resignation the following sentences occur:

"During this period [27 years] he has made himself a world-wide reputation as a neurologist and also as a great teacher. We are more concerned, however, with the fact that no one, except perhaps his own father, was so punc-

tilious in the fulfilment of his Infirmary duties, and there have been very few physicians who have been so beloved by all associated with them."

While holding office at the Royal Infirmary he was appointed to the lectureship in neurology in the University; and in 1922 he became Moncrieff Arnott Professor of Clinical Medicine, retaining his neurological lectureship. For many years he was principal medical officer to the Scottish Union and National Insurance Company, and he remained in office till he was succeeded by his son-in-law, Dr. J. K. Slater, on the latter's return from war service. The Royal College of Physicians of London appointed him Bradshaw Lecturer in 1925 and Croonian Lecturer in 1927. In Australia he delivered the Halford Oration at Canberra in 1935.

Many honours came to him. He was for two years President of the Royal College of Physicians, Edinburgh, and at different times he was President of the Association of British Neurologists, of the Section of Neurology at the annual meetings of the British Medical Association in 1927 and 1935, and of the Section of Neurology of the Royal Society of Medicine (1927–8). He received the honorary degree of LL.D. from his Alma Mater and the honorary M.D. of Melbourne. A few weeks before his death he received intimation of the Honorary Fellowship of the Royal Society of Medicine—an honour he highly prized, and the news of which gave him great pleasure. It is sad to reflect that he never saw the beautiful scroll in its handsome container, for it arrived at his home a few hours after his death.

The Edinburgh Post-Graduate Medical School largely owes its present state of efficiency to Edwin Bramwell, who was appointed its first secretary in 1906. He gave five years' arduous work to the building up of this successful organization. He was a prolific writer on many subjects, chiefly on his own specialty, neurology. More than one hundred of his papers are to be found in many medical journals and in large systems of medicine, such as those of Clifford Allbutt, Osler, and others. As a teacher, Professor Bramwell endeared himself to a wide circle of students and postgraduates. He held strong views on the desirability of training the student to read and to think in direct relationship to his hospital observations and experience. He was a superb clinical teacher, introducing the patient to his audience without preliminary remarks, and then drawing the students' attention to abnormal appearances and their significance. Then followed the physical examination and the pathological significance of the findings—and so to differential diagnosis, prognosis, and treatment. Finally the student was referred to a textbook for a systematic description of the disease. Students came to his wards to study disease under a master teacher who admitted the difficulties of the case as readily as he indicated the demonstrable facts. His diagnostic skill was recognized by a wide circle of students and practitioners, and he was at his best when unravelling a knotty neurological problem or dealing with a functional abnormality, for which he had a special diagnostic flair. His standard of work was always of the highest, and he instilled into his younger colleagues and assistants a full sense of the responsibilities of their profession and a clear direction that nothing but the best was acceptable. Many a keen house-physician worked with loyalty and enthusiasm till nearing exhaustion, but the "chief" was always appreciative of such endeavours. His quiet dignity and courteous unruffled manner in disturbed situations conveyed a feeling of confidence much appreciated by those in distress. He had, in fact, all the qualities of a really great physician.

Those of us who were privileged to enter his home circle learned much of Professor Bramwell's wide outlook on life. During his active professional career he and Mrs. Bramwell dispensed lavish hospitality, and many visitors to Edinburgh from abroad were made welcome at 23, Drumsheugh Gardens. He was generous to a fault in thought and action, always willing to help in time of hardship, caring little for his own comfort or advancement in his endeavour to uphold the golden rule and do what he believed to be in the best interest of the Edinburgh Medical School. His residents, clinical tutors, and assistant physician knew full well how much they owed to their chief, and in how many ways his generosity helped them to start and progress in their several niches in the medical profession.

Professor Bramwell was a keen angler, and at one time contributed articles to the *Fishing Gazette* under the title of "The Professor." On several occasions he was within a few ounces of winning the much-coveted cup competed for annually on Loch Leven by the Edinburgh Medical Angling Club.

All who knew Professor Bramwell, both personally and by repute, will wish to express their deep sense of sympathy with Mrs. Bramwell (elder daughter of the late Professor D. J. Cunningham), whose unwearying co-operation and support were always available during her husband's professional life, and even more so during the many years of his progressive ill-health and increasing physical disabilities. We also extend our sympathy to his son and daughters in their present sorrow.—A. F. H.

G. W. M. FINDLAY, C.B.E., M.D., D.Sc., F.R.C.P.

Dr. W. N. Leak writes: In view of Dr. Findlay's outstanding work in research it is perhaps worth while starting a little earlier than F. O. M.'s (March 22, p. 659) excellent account of his development. During most of his time in the Navy, Findlay was port medical officer at Port Said, which gave him a lot of spare time. I was, for a while, resident medical officer at the British Hospital there and got to know him well, which accounted for me being able, years later, as Dr. O. C. Carter relates (p. 658), to leave a Journal Committee meeting, in company, I think, with Dr. Cockshut, and induce him to become editor of our new Abstracts. At Port Said there were several thousand Armenian refugees, and many of these developed pellagra, whose aetiology was at that time unknown. Findlay perhaps had some slight responsibility for their health, and certainly for seeing that a possibly epidemic disease did not spread (Dr. Louis Sambon at that time was a strong advocate for it being an insect-borne infection), so the problem of its aetiology naturally attracted his ever-inquiring mind. He started some animal-feeding experiments in very difficult surroundings, but when I left the British Hospital for Palestine he took over my duties and so acquired ample space for his animals and also the resources of an adequate pathological laboratory which the hospital had asked me to equip. This was what gave him his first impulse towards vitamin research, and seldom can the untrammelled use of incubators, microtome, and an excellent microscope have proved more fruitful, for it was there, left to his own devices, that Findlay made his mistakes and mastered his technique.

Dr. F. E. D. Griffiths writes: I am sure I speak for all those junior officers of the R.A.M.C. who served in West Africa and met Marshall Findlay, or the "Brig" as he was affectionately known to us. His visits to lonely outposts were an occasion for joy on the part of any young medical officer; for, unlike his peers on the administrative medical

staff, he was more interested in the medical side of our work. He would appear in his characteristic garb—his stockings at different levels, and his badges of rank attached by large safety-pins—his shrewd, kindly, humorous eyes hiding under an old battered bush hat. He came as a friend and adviser, and no problem was too small to escape his interest and comment. His suggestions for investigations and surveys were followed by a close interest in their results, and his visits had the effect of a tonic on a life that was often marred by boredom. No one would have described him as a smart officer, but his appearance belied his organizing ability. The success of the campaign he organized to combat and treat the outbreak of bilharzia in Nigeria in 1944 showed his power to marshal men and materials to the best advantage, and it was largely due to his efforts that the 82nd Division sailed to India. He was a delightful companion, always approachable, and his knowledgeable conversation was usually spiced with pithy comments. No man dies as a "big" man unless he is mourned by the "little" men. He was a big man.

Medical Notes in Parliament

N.H.S. DEBATE IN THE LORDS

Viscount BUCKMASTER, on March 26, called attention in the House of Lords to the working of the National Health Service. It should not be difficult to effect economies. The hospitals were in part responsible for the medicinal Niagara. Possibly with the exception of the teaching hospitals, it was not altogether right to blame the general practitioner for stimulating an urge to consume every form of drug. The teaching hospitals were run by management committees directly in touch with the Minister, and that system appeared to work well. He felt, however, that the intervention of a regional board between other hospitals and the Ministry must cause both waste and delay. The Minister played too large a part in the selection of these boards. He would like to see a delegation of power to the hospital management committees. The doctors under the scheme felt frustrated by inspection, direction, and control. Turning to the general practitioner, Lord Buckmaster welcomed the decision to increase the payments to him, but said this would not guarantee a cure for the evils which existed. Parliament must do its utmost to improve the standing of the general practitioner and to encourage young men of the best type to enter general practice.

Few doctors were willing now to take a partner. They found it unprofitable. If the young man started otherwise he nearly always failed to find a house in which to live and a place in which he could practise his profession. Formerly, when a practice was sold, the surgery went with it. Now when a man retired he sold the house, or, if he died, his executors did this. In either case, the incoming doctor had nowhere to go. An even greater feature was the almost complete exclusion of the doctor from the hospital. The general practitioner felt that he was excluded from the hospital field and that the cottage hospital was often becoming a specialist unit.

There was a minority of patients who needed to be educated. It was necessary to instil into them a sense of restraint. He shrank from the enforcement of discipline against patients, but it might be possible to draw up a form of code like the Highway Code which could be brought to their notice.

Against Hospital Charges

Lord SHEPHERD regretted that Lord Buckmaster had not mentioned some of the achievements of the Health Service. He thought Lord Buckmaster was accurate in saying that the costs of the Service would continue to rise until the full needs of the nation had been met. Costs were higher because prices had been advancing against the Government. Although difficulties had arisen in management committees and regional boards, the work accomplished by both had been beyond praise. He hoped the Government would not think of changing from the present practice to a scheme such as that operated by the University Grants Committee. It could not be thought that the country would agree to block grants when it was spending over £400m. yearly on the National Health Service.

He said that in the interests of economy a number of quarters had suggested something in the nature of hotel charges to be paid by patients when going into hospitals. He hoped the Government would stand firm against that suggestion, even when it came from the B.M.A. The people were already paying for the service and would always have to pay for illnesses.

G.P.s' Work in Hospitals

Lord MORAN said no doctor would believe that charges on prescriptions and dental treatment had demolished the structure of the Health Service. He said it was agreed that there was discontent among the general practitioners. If the doctors felt that they had had a raw deal the judgment of Mr. Justice Danckwerts would perhaps reconcile them to the Service. But he felt that a more deep-rooted cause of discontent was the insidious decline in the status of the general practitioner. That had begun when patients, conscious of the technical advances in medicine and surgery, decided they were safer in hospitals under specialists than in their own homes under their own practitioners. When the general practitioner saw a patient whom he had known for years put himself into the hands of a complete stranger in a medical emergency his pride of craftsmanship suffered a blow. Some practitioners lost heart. The best of these practitioners had made modest excursions into the specialist field, but when the Act came all that was taken from them.

The remedy must be to let the practitioner follow the patients into the hospitals. That seemed to Lord Moran the most important reform in administration that had emerged in medicine in his lifetime, but it would meet with much opposition. There were 500,000 hospital beds in the country, of which only 6,449 were in general-practitioner hospitals, and the specialist would resist the dilution of labour. The general practitioner also might be tepid about pressing for admission to the hospitals. It was not right that 5,000 consultants should work under ideal conditions while 20,000 practitioners worked under conditions which were scientifically unsound. He hoped that the difficulties in getting the practitioners into the hospitals would be boldly faced.

Financial Balance

It was important that the financial balance between the two branches of the profession should be preserved. He recounted the difficulties in the training of a specialist, and said it was not going to be easy to tell him at the end that he would have been better off financially if he had not undergone that training. There was already a feeling that the award might mean that the average general practitioner would earn more in the year than the average consultant. If that turned out to be so, great difficulties would be raised for the medical schools. The general practitioner had been awarded 100% betterment, but the consultants up to date had been given 20%. That was unjust. He believed the consultants would act with responsibility and would not put their claims too high, but the position had to be set right. If it was left unamended the consultant would eventually go to arbitration, and arbitration was not necessarily economical. The matter would be much easier to settle now than in three years.

If 3s. a day or £1 a week was charged for food to patients who were able to pay for it, making exceptions where necessary, the general exchequer would benefit by £10m. per annum. But it was obvious that if people were told, "Here is a free service," and charges were put on they were apt to be politically inconvenient. It was vital to economize.

Expensive new techniques and drugs would frequently come along and must be incorporated in the Service. If it expanded like that it must retract somewhere or burst. It would be disastrous to lower the standards of the hospitals, to close beds, to cut down medical schools, or do anything of that kind. The alternative was to put a charge on something. If the House trusted to appeals to bring down the drug bill nothing would happen.

Radical Pruning

Lord WEBB-JOHNSON said it might be that Parliament should do some radical pruning for the benefit of the Health Service itself. It had been generally agreed by their Lordships in a debate last year on the Health Service that there was need for more decentralization. It should not be lightly accepted that the block-grant system was unsuitable for the hospital service. When members of the medical profession reflected on extravagances they knew that every pound unnecessarily spent on the administrative side might mean a pound taken away from the patient. He believed that hospital boards had been burdened with too much concern about details and that if individual hospitals had more discretion they could secure more efficiency and some saving. Means could be devised to insure that hospital management committees to some extent represented the people of the district. Local interests would thereby be revived and voluntary workers encouraged. The ideal should be a maximum of guidance from the centre but a minimum of control.

Among other means of meeting financial strain was an increase of pay-bed accommodation. He favoured a charge for prescriptions, feeling that without it there was inevitable waste and greed. The experience of general dispensaries and hospitals was that a small charge cut down the wasteful use of drugs.

Lord WAVERLEY said Mr. Lloyd George's Health Scheme had nearly been wrecked by lax certification and extravagant prescribing. The remedies had been institution of medical referees to deal with certification and publication of an approved list of therapeutic equivalents. A number of medical practitioners who had gone through courses of advanced study found it impossible to obtain positions as consultants and yet found it extremely difficult to establish themselves in the general practitioner service. He hoped the recent award would enable them to find a footing among general practitioners under the Health Service.

Government Reply

Lord ONSLOW, replying to the debate, said the Government realized that the linchpin of the Service was what was known as the G.P. Three bodies had been looking into the matter and two were still sitting. The Health Service should not, by taking too large a share, prevent Parliament from running other essential services as efficiently as they should be run. The question of a "hotel charge" in hospitals was not in the mind of the Government at the moment. Both parties would agree that the National Health Service Act must be amended from time to time, and he suggested that the more the subject was kept away from party politics the better would be the result for the nation as a whole. On the question of over-prescribing, he referred to "Prescribers' Notes" (*Journal*, March 29, p. 701) and said this should have a useful effect. The Minister was most anxious that provision of health centres should be developed, but progress was bound to be slowed down because of the shortage of building materials and the building of houses. It was probably more important to ensure that a sufficient number of houses were built. As for Lord Buckmaster's suggestion of a code for patients, Lord Onslow understood there was one on the back of the Health Card.

Lord BUCKMASTER pointed out that in 1948 health centres were estimated to cost £374m. He did not see how the nation could carry out such a task now. He had in mind not the creation of health centres but the securing that cottage hospitals should not be turned into specialized units.

The debate then concluded.

ADJUDICATION AWARD

After the Minister of Health's statement in the Commons on March 25 (reported in the *Journal* of March 29, p. 718) the following discussion took place.

Mr. HILARY MARQUAND said that the Minister had reminded the House that there were two parts to the agreement to refer this matter to arbitration. He asked that he should now confirm that there was no intention whatsoever of departing from the understanding that this involved a redistribution of incomes, including some reduction in the size of the larger lists and a better opportunity for younger men to enter into practice, and possibly some encouragement to the establishment of group practices. Before he asked Parliament to vote the very large sum here involved, would the Minister make available to the House the evidence which he laid before the learned adjudicator about the size of present earnings of doctors in the Health Service?

Mr. H. F. C. CROOKSHANK agreed to consider that. There was no question of bringing a vote up until the next financial year began. Regarding the first question, there was a working party consisting of representatives of the profession, his department, and the Scottish Health Department now looking into these points, which were a part of the terms of reference.

Mrs. E. HILL asked what relation this had to the Spens report. Mr. CROOKSHANK said he understood that the Labour Government accepted the principles of the Spens report, and the adjudicator had now decided what was the sum of money necessary to give retrospective effect to the report as accepted by the late Government.

Mr. RALPH ASSHETON asked the Minister to consider whether this was not a matter which gave rise to very serious consideration, and whether there was not a growing tendency for Parliament to abandon its responsibility for controlling expenditure and placing it in the hands of other bodies. (Hear, hear.) Mr. CROOKSHANK pointed out that all this was decided before he came into office.

Mr. A. BLENKINSOP inquired whether they were to understand from that that the Minister disagreed with the whole conception of an independent adjudicator. Mr. CROOKSHANK denied this. It was an honourable obligation into which naturally he had to enter. He was not concerned with what happened before nor with the presumably abortive negotiations since 1948 which made such an adjudication necessary.

Mr. H. HYND asked whether this increased pay for doctors meant that there would be some cuts necessary in the Health Service.

Mr. CROOKSHANK said he would have thought it stood to reason that this was additional expenditure to which they should eventually be committed. It did not arise at the moment, because it could only be covered by a supplementary estimate. It was too late in this financial year to discuss further supplementary estimates. That did not detract from the fact that it would be an extra burden one way or another on the Health Service unless other steps were subsequently taken.

The present position was that they had tried in the estimates to keep next year's National Health Service below the ceiling of £400m. set by the late Government. To achieve that certain charges were to be put before the House in the debate on the Bill. Since that decision was taken they had had this adjudication, the effect of which might be an increased cost of something like £40m., of which a proportion, but of course not all, was concerned with next year. Some of it was back pay. What the Government's policy would be with regard to that would be discussed and settled when the time came.

HEALTH SERVICE CHARGES

Mr. HARRY CROOKSHANK on March 27 moved the second reading of the National Health Service Bill. He said that when the Government considered whether savings could

be made in the Health Service it had in mind the question of whether there were obvious abuses to be rectified. Could the emphasis be altered in the right direction? By the Bill such improvements could be made while at the same time expenditure was restrained. All the Government did in the Bill was to work to exactly the same ceiling as the Labour Government had done last year. Because costs had risen the present Government, like the last one, was putting on charges.

Regulations were delayed under the Labour Government's Act of 1949. That Government had decided it was a proper thing to put a charge on doctor's prescriptions, and the present Government would make regulations to impose a 1s. charge which might save the Exchequer something like £12m. sterling. The Labour Government in 1949 had taken power to issue regulations covering prescriptions and appliances prescribed by doctors, but had not taken similar power in the case of prescriptions and appliances provided in out-patient departments of hospitals. That a person got medicine or appliances from an out-patient department of a hospital should not be of advantage to him.

Doctors in Rural Areas

Mr. Crookshank said the Ministry was still having conversations with doctors and chemists about the practical difficulties, particularly in rural areas. Persons having prescriptions made up by chemists must pay not more than 1s. Those who got their medicine from dispensing doctors paid 1s. when the medicine was dispensed. The 1s. would be paid per form and not per item on the form. There would be no exceptions, but those in receipt of National Assistance grants would presumably get a refund from the office where they drew their assistance. For that purpose they would produce a special receipt which the chemist or the dispensing doctor would have given them. The same applied to war pensioners in respect of charges incurred by reason of their accepted war disability. Such persons would not require new books.

Hospital Charges

Clause 1 of the Bill took power to charge when appliances were provided by hospitals. The Bill also brought in hospital out-patients for a small range of appliances. The Government did not propose to touch artificial arms or legs, but there would be charges for surgical boots and a charge of £1 each for surgical abdominal supports. Many cases of alleged abuse had been reported of prescribing what was not much more than a reinforced corset. Elastic hosiery would be charged from 5s. to 10s. according to its character, and wigs charged £2 10s. It had been suggested that a charge should be made also for hearing-aids, but it had been realized that there was a big backlog in hearing-aids and that it would be unfair to many who had been on the list for long that they had to pay when their next-door neighbour did not. There would be no charge for hospital appliances in the case of children under 16 or in full-time attendance at school, nor to persons in receipt of National Assistance or their dependants, nor to war pensioners in respect of accepted disability.

As regards dental charges, the Government was prepared to raise the exemption age from the school-leaving one to 21 years, which would reduce the saving by about £1m. He was not persuaded that a maximum charge of £1 would reduce dental conservation work for the adult population, but it would be a good idea that all examinations should be free of cost and that the charge should begin only after the mouth had been examined.

Mr. MCNEIL asked whether where there was chronic illness and a predictable amount of drug was needed practitioners would be permitted to make allocation ahead so that the patient did not come every week to pay 1s.

Mr. CROOKSHANK said that was more or less the practice now. Doctors frequently prescribed in chronic cases for a considerable period, and he would do nothing in the Bill which would stop that.

The Adjudication

Mr. Crookshank said that the adjudication increased the remuneration of general practitioners in the basic year 1950–1 by £9.76m., and the total bill next year might be of the order of £40m. including backlog from other years. He estimated that taking the £30m. payable next year out of the account, and if no major catastrophes occurred and the charges proposed in the Bill were accepted, the ceiling of £400m. for the Health Service would be exceeded by comparatively little. It was not the intention of the Government as a result of the Danckwerts award to increase any charges he had mentioned in connexion with this Bill. If as a result of the award the figure of £400m. was surpassed in 1952–3 all would have to accept the situation and the ceiling would go up *pro tanto*. He declared that unless Parliament could restore confidence in sterling and stop the drain on national reserves it was not the Health Service which would be destroyed but the foundations of national economy, and much which the House had created would disappear in the twilight of national bankruptcy.

Prescribing Costs

Dr. EDITH SUMMERSKILL said that the Government proposed to erect a financial barrier between the doctor and the poorest in the community. The old person in the lowest income groups would suffer hardship and so would small pensioners, widowers, blind persons, orphans, the chronic sick, epileptics, diabetics, and the tuberculous. Mr. Crookshank had said there was no intention to interfere with the treatment of doctors, but no doctor could say to a chronic sick person that he would give a prescription to cover three months' treatment and then wash his hands of the treatment. These people would see the doctor often and would have every time to pay 1s. for each prescription. She said all Members deplored the fact that the coal-miners had made a violent protest when this Bill was printed, but these miners were thinking of thousands of men disabled by pneumoconiosis who would be called upon to pay 1s. for prescriptions for the rest of their lives.

Dr. Summerskill said that according to a Ministry of Health report the approximate proportion of proprietary prescriptions under the National Health Insurance Scheme before the war was 3%. This rose to 7% in 1947 and to 12% in 1948. By the end of 1949 it was 21%, and she believed that to-day it was over 30%. Who were consuming the expensive drugs? Pharmacists practising in an area of Greater London had compared the cost of their prescriptions over the last 12 months. In a suburban area of high rateable value the cost of a prescription was as high as 7s. 6d. In a favoured residential area on the borders of Middlesex it was 6s. In a large and varied urban district it ranged from 2s. 10d. to 4s. In a crowded industrial borough it was 2s. 3d.

An article in the *British Medical Journal* of February 9 on prescribing made most depressing reading. Dr. Dunlop, who was responsible for the review, after criticizing the position to-day, said that good prescribing was often economical prescribing.

Mr. PHILIP BELL said that in the Isle of Man a charge was made for prescriptions and he had not learnt that mortality there had increased on that account.

Mr. Bevan's Resistance to Compulsory Arbitration

Mr. ANEURIN BEVAN said the recent arbitration award seemed to him to overshadow the whole debate. That award had shocked the majority of people in Great Britain. Something had gone wrong with the sense of values when Parliament could confer £40m. upon one branch of the medical profession and at the same time propose to impose charges on the old-age pensioners. When the State intervened with practical administration other factors must be taken into account than adding up sums. That was why he himself had resisted a proposal to put compulsory arbitration into the N.H.S. scheme. Once a compulsory arbitra-

tion clause was introduced, negotiating skill was no longer necessary and each party refused to budge. He had refused that proposal because he thought it would ruin relationships between the Government and the medical profession and because it put the budget outside the House. Parliament ought not to leave an outside body or person to decide the Chancellor's budget for him. When 400,000 people were brought into direct contractual relationships with the State, Parliament should always reserve the right of the Government to refuse to accept any recommendation made by an outside body. It was lamentable that the House should now be faced with an enormous bill which made nonsense of its discussions. There was all the difference in the world between providing a reasonable increase in the remuneration of general practitioners and adding an enormous sum which would be an irritant in every industrial negotiation in Great Britain.

The gap between professional awards and the standards of manual workers was getting too wide. Large numbers of professional workers were now educated at the expense of the State and no longer had to give up for many years earning money in order to equip themselves. So the judge and those bodies who were arbitrating on professional standards were attempting to maintain their own status and their own standards. The constitutional implications for the House were exceedingly serious.

Mr. Bevan said that when the House had discussed his own Bill members opposite had thought he was not quite serious about his prescription charge proposals. Neither he was. The Treasury had looked at the number of prescriptions and had said that if one shilling was charged for each of them it would get £10m. It was no good arguing with the Treasury, for they just arrived at a simple sum and then demanded it. The level of expenditure on the dental service, ophthalmic service, and artificial limbs had merely been due to the fact that the Ministry was working off arrears of neglect. That was not true of the pharmaceutical side. This was because the medical profession was an ill-disciplined profession. He said that advisedly, having had more experience of the profession than most. The reason for the increase on the pharmaceutical side lay mainly in the enormous increase in the use of antibiotics. Very expensive new drugs were responsible for keeping a number of old folk alive and also young folk as well. Some writers on medical finances said the nation could not afford this. They and Conservative M.P.s said in effect, "Let us have a selected list of dying. Let the poor die first. If you cannot keep all of them alive, keep only the well-to-do alive." That was exactly what was behind all this.

The miserable crowd opposite were keeping on permanently a proposal which the Labour Government decided to end in 1954 because it believed that by then it would be out of its troubles. The Conservatives were fighting the poor. The arms programme of Great Britain was being made by the Conservative Government into an excuse to dismantle the welfare state.

Mr. IAIN MACLEOD said that it was not true that the cost of drugs was the major reason for the increased cost of the pharmaceutical service. The cost of drugs had gone up from £35m. to £51m., but the number of prescriptions from 202m. to 229m. The case for the shilling charge was much stronger now than when Mr. Bevan proposed it.

He was delighted by the Danckwerts award. If a deterrent charge reduced the queues at surgeries and freed the doctors, it was justified socially and medically.

Mr. HECTOR MCNEIL said the difference between the Conservatives and the Labour Party was that his Party came to the House and said frankly that the difficulties of providing for exemptions were so many that it could not proceed with the charge for prescriptions.

Mr. HUGH LINSTEAD pointed out that doctors had long been accustomed to prescribe quantities of medicine sufficient for a longish period. They would continue to do so. Diabetics would not require to go even once a fortnight to their general practitioners.

Mr. JOHN BAIRD said that to say Parliament was destroying the Service was ridiculous.

Dr. STROSS said the Labour Party would oppose the Bill on the Committee stage and would organize protest meetings in the country.

Rejection Moved

Mr. H. A. MARQUAND then moved the rejection of the Bill. He said the present Bill sought to impose charges in perpetuity. He had recommended charges as a distasteful measure. The only charge he had not specifically denounced last year was the one for dental treatment. He had not done so because it never entered his head that anyone could encourage people to wait until their teeth were thoroughly rotten before going to the dentist. The projected charge for prescriptions was a breach of contract with all who had contributed to National Health Insurance between 1911 and 1948. A comprehensive Health Service without charges was the only sensible form of service with which to combat ill-health.

Commander T. D. GALBRAITH closed the debate for the Government. He remarked that the Labour Party, for reasons which seemed good to it, had placed a ceiling on the expenditure of the Health Service but made violent protests when their opponents took steps to keep below that ceiling. It had appeared to the present Government that no exemption scheme could be administered with equality unless the doctors were saddled with the responsibility for deciding which patients would be in the exempted category. Instead of turning up that blind alley, the Government set up a procedure which made a refund as easy as possible for those whose need was greatest. He agreed that there were difficulties in rural areas, and he sympathized with dispensing doctors, who were asked to undertake additional work. He could not accept the argument that doctors were being made tax collectors or that the doctor–patient relationship was being undermined.

The House then divided and the Bill was read a second time by 304 to 279. After a further division it was sent to a Committee of the whole House.

Stage Hypnotism

Mr. E. W. SHORT, on March 20, asked the Minister of Health to investigate the case of Elizabeth Yates, Sunderland, who was seriously ill after being hypnotized on the stage of a Sunderland theatre. He asked if he would take urgent steps to protect the public. Miss PAT HORNSBY-SMITH answered. She said Mr. Crookshank had made inquiries and was informed that the patient had recovered and was convalescent. Cases of this kind were rare. There was no present intention on the part of the Government to introduce legislation and the Minister had no power to control such performances.

Increased Hospital Costs

Miss PAT HORNSBY-SMITH estimated on March 20 that the increased expenditure which the National Health Service hospital authorities would incur as a result of the reduction of food subsidies would probably be about £1¼m. a year when the reduction was fully operative.

Cancer Research

Mr. LESLIE LEVER on March 20 asked for the expenditure of more money to intensify cancer research. Miss PAT HORNSBY-SMITH replied that the Ministry of Health had this question constantly under review in consultation with the Medical Research Council. It was estimated that more money would be spent in this financial year on certain developments which would be in the interests of research as well as treatment.

Drug Convictions.—The number of convictions under the Dangerous Drugs Acts for the years 1949 and 1950 were 159 and 147 respectively. The provisional figure for 1951 is 234.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **March 15** (No. 11) and corresponding week 1951.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1952					1951				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	53	5	9	0	1	50	2	29	0	0
Dysentery	642	57	35	1	1	1,672	194	213	19	1
Encephalitis, acute	3	0	4	0		2	1	0	0	
Enteric fever:										
Typhoid	4	1	0	0	1	1	0	1	0	1
Paratyphoid	7	0	3 (B)	1	1	5	0	0	0	2
Food-poisoning	117	13		0		88	9		1	
Infective enteritis or diarrhoea under 2 years				12	18				16	23
Measles*	7,121	256	514	303	279	31,837	3136	482	94	90
Meningococcal infection	46	7	12	1	6	38	1	12	1	5
Ophthalmia neonatorum	33	4	10	1		41	3	16	1	1
Pneumonia†	950	38	506	13	3	1,106	64	257	22	12
Poliomyelitis, acute:										
Paralytic	13	0	0	2	1	18	2	1	0	2
Non-paralytic	9	1				0	0			
Puerperal fever§	240	35	4	1	2	80	13	12	1	
Scarlet fever	1,546	118	211	24	72	1,007	54	173	46	48
Tuberculosis:										
Respiratory			146	42				182	31	
Non-respiratory			33	4				35	6	
Whooping-cough	3,086	158	310	163	91	5,516	402	852	34	91

DEATHS in Great Towns	1952					1951				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	1	0	0	*0*	0	*0*	0	0
Dysentery	0	0		0			1		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0		0		*0*	0	*0*	0	
Infective enteritis or diarrhoea under 2 years	8		0	1	1	*16*		*5*	2	0
Influenza	33	3	23	0	1	*88*	15	*5*	0	10
Measles		0		0	0		0	*0*	0	0
Meningococcal infection		0	1				0	*1*		
Pneumonia	322	53		12	6	*326*	57		12	15
Poliomyelitis, acute	1	0			0	*0*	0		0	2
Scarlet fever		0		0	0		0	*0*	0	0
Tuberculosis:										
Respiratory	142	26	27	4	13	*227*	34	*24*	6	11
Non-respiratory		2	3	2	1		5	*5*	1	0
Whooping-cough	7	0		0	1	*10*	3	*3*	1	0
Deaths 0–1 year	259	34	29	9	16	*299*	32	*54*	10	16
Deaths (excluding stillbirths)	5,732	875	712	128	170	*6,579*	1042	*737*	150	211
LIVE BIRTHS	8,072	1203	957	228	437	*7,644*	1188	*949*	235	296
STILLBIRTHS	198	32	25			*172*	25	*23*		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Vital Statistics

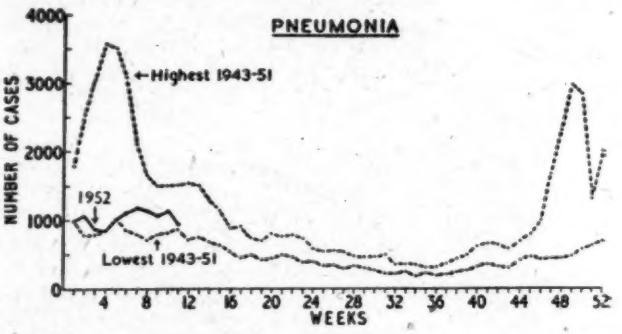
Diphtheria Low Record

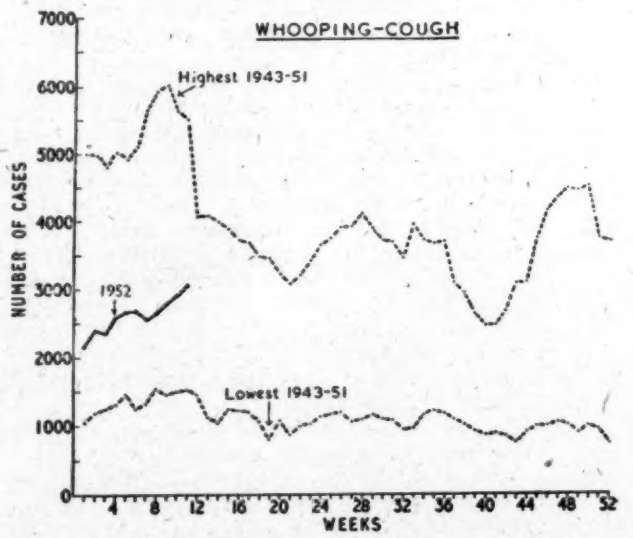
The decline in diphtheria continued in 1951, when new low records were again set up in England and Wales. Deaths fell to 32, compared with 49 in 1950, and notifications were only 699 against 959. A warning against allowing the immunization campaign to slacken is sounded by Dr. W. P. D. Logan, Chief Medical Statistician of the General Register Office (*Monthly Bulletin of the Ministry of Health*, March, 1952). He says that the situation is now being reached—a situation scarcely dreamed of in 1940 when the immunization campaign started—where the eradication of diphtheria as an indigenous disease in this country can be foreseen as a very real possibility within the next few years, provided there is no slackening in the immunization efforts that have been so dramatically successful in the past 10 years.

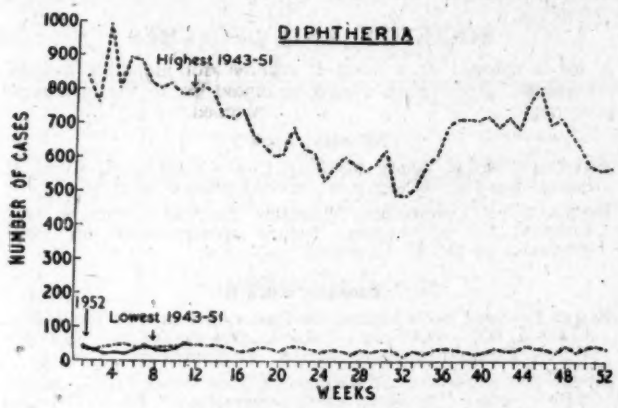
In 1950, 70 of the 83 county boroughs in England and Wales had no deaths from diphtheria and 33 did not have a confirmed case. There were 14 county boroughs with an aggregated population of nearly 1¼ million that did not have a single death during the five-year period 1946–50. They were Blackburn, Blackpool, Canterbury, Chester, Dewsbury, Eastbourne, Hastings, Oxford, Preston, Southend, Southport, Warrington, Worcester, and York.

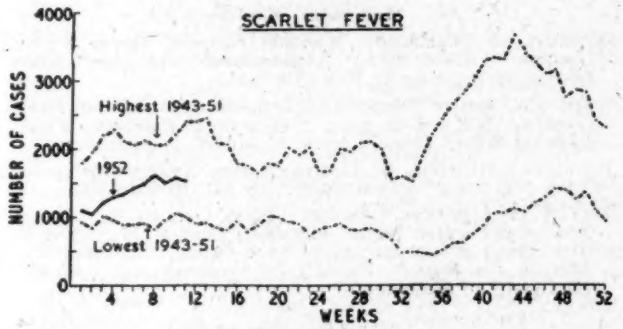
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported during the nine years 1943–51 are shown thus --------, the figures for 1952 thus ————. Except for the curves showing notifications in 1952, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Infectious Diseases

The only large variations in the incidence of infectious diseases in England and Wales during the week ending March 15 were increases in the number of notifications of measles by 238 and whooping-cough by 168, and a fall of 193 in the number of notifications of acute pneumonia.

The largest fluctuations in the local trends of measles were decreases in Yorkshire East Riding by 116 and Kent by 76 and an increase of 92 in Durham. The increase in the incidence of whooping-cough was mainly contributed by two areas, London and the south-eastern counties, where the notifications rose by 110, and Lancashire with an increase of 71. The notifications of scarlet fever were 35 fewer than in the preceding week; the largest variations during the week were an increase of 30 in Lancashire and a decrease of 31 in London.

The notifications of diphtheria were 15 more than in the preceding week; the total was the largest for 64 weeks. Lancashire, with a rise of 12, was the chief contributor to the increase. The rise in Lancashire was due to an outbreak involving 17 persons in Darwen M.B. This is the second occasion during this quarter that one-third of the total notifications in the whole country have been recorded in this town. The last time was February 16, when 10 cases were notified.

The number of notifications of acute poliomyelitis were the same for paralytic cases and three more for non-paralytic cases than in the preceding week. The counties with more than one notification were Somersetshire 5 (Yeovil R.D. 4); Yorkshire West Riding 3 (Selby R.D. 2); Lancashire 3.

The incidence of dysentery, with an increase of three notifications on the preceding week, remained at the high level of the past few weeks. The largest centres of infection were: Lancashire 167 (Oldham C.B. 31, Prestwich M.B. 28, Manchester C.B. 18, Radcliffe M.B. 15); Norfolk 57 (Norwich C.B. 36); London 57; Middlesex 47 (Enfield U.D. 15); Northumberland 31 (Newburn U.D. 17); Leicestershire 28 (Leicester C.B. 18, Blaby R.D. 10); Berkshire 23 (Newbury M.B. 11); Durham 22 (Blaydon U.D. 10).

Smallpox in Lancashire and Hampshire

The outbreak of variola minor in Lancashire remains confined to Rochdale and the surrounding districts, but a young soldier, infected at Rochdale, has developed the disease at Aldershot. A further 16 cases were notified during the week ending March 29, making a total this year of 126. There have been no deaths.

Littleborough U.D. is now free from infection. A case with onset on March 23 was reported from Bacup borough, Lancashire, during the week. The Aldershot case was admitted to hospital on March 17, when the rash appeared.

Week Ending March 22

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,486, whooping-cough 3,133, diphtheria 33, measles 6,885, acute pneumonia 848, acute poliomyelitis 20, dysentery 516, paratyphoid fever 6, and typhoid fever 1.

Medical News

Call-up of Reservists.—During the last two or three months personnel branches at the War Office and the record offices of the various regiments and corps have been selecting officers and men who are to be recalled. Warning notices have been sent out, and very shortly medical examinations will begin. Medical board reports will be forwarded to the personnel branch or record office concerned. Minimum medical standards have been laid down for all units to which reservists are being recalled, and those who are up to the standard required will receive a notice telling them that they are fit for training. The unit medical standards vary considerably, depending on the nature of the unit and its probable operational role. Some of the standards are high, and a number of men will be rejected. It was found last year that rejection notices caused some concern to the reservists, particularly to those who had just failed to come up to the high standard required for a particular unit. Many of these men would in fact have been fit for training in a unit taking a slightly lower medical standard, and have therefore been retained on the reserve. During the 1951 call-up many men wanted to know the reason for rejection. Where the disability was a minor one a simple explanation in general terms was given to the reservist. If a medical board had discovered a more serious disability the reservist was advised to consult his own doctor. The reply to the reservist also indicated how his doctor could obtain a confidential report on the disability discovered. This will be done again this year. Certain reservists who considered that they were unfit for training last year submitted medical certificates after receiving a call-up notice. It is expected that this will happen again, and if there is a serious disability arrangements have been made for the reservist to be exempted from call-up. In some cases, however, the reservist will be required to attend for medical examination before exemption is granted.

Isonicotinic Acid Hydrazide.—The Ministry of Health states that the favourable reports from America suggest that isonicotinic acid hydrazide may represent a considerable advance in the chemotherapy of tuberculosis. This drug, therefore, certainly needs to be fully investigated; but at the same time, even on present evidence, it is clear that it would be unwise to use it indiscriminately. It is by no means certain that it is harmless; indeed, animal experiments indicate the possibility of toxicity, particularly when the drug is used for a considerable time. In man little or nothing is known of long-term toxicity. Another strong reason against indiscriminate use is the possibility of developing resistant strains of tubercle bacilli in the community. Nothing is known of this in man yet, but it is known that such strains can develop in the laboratory.

It would seem prudent for the present to limit its use to the treatment of in-patients in such hospitals as are equipped with a full laboratory service.

A Surgical Occasion.—A meeting to mark the jubilee of the Surgical Travellers' Club was held in London last week from March 26 to 29. The club was founded by Sir Heneage Ogilvie in 1927, and on the present occasion a presentation was made to Sir Heneage and Lady Ogilvie by the club to record its appreciation of all that they had done for the club during the last 25 years. At this meeting visits were made to St. Mary's, the Middlesex, Guy's, Great Ormond Street, "Bart's," and to the Royal Veterinary College. A dinner was held at the College of Surgeons on Friday, March 28. Among those who made speeches were Sir Heneage Ogilvie, Sir Stanford Cade, Mr. Dickson Wright, Mr. Geoffrey Keynes, Mr. Walter Mercer (President of the Royal College of Surgeons of Edinburgh), and Professor Norman Dott, who proposed Sir Heneage's health. Sir Heneage, in reply, reminded the club that they counted among their members 10 consultants to the armed Forces, four members of the council of the Royal College of Surgeons of England, and the President of the Royal College of Surgeons of Edinburgh.

Any Questions?—The first edition of *Any Questions?* sold out within two months of publication. The second edition is now ready, and copies may be obtained (price 8s., including postage) from the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

Scottish National Galleries.—Lady Olive Watson, M.B., Ch.B., has been appointed a member of the Board of Trustees for the National Galleries of Scotland for the period until March 31, 1957.

Sheriff.—Major E. Davies-Thomas has been appointed Sheriff for 1952 for Cardiganshire.

Emergency Bed Service: Applications and Admissions.—During the seven days ending March 30 the number of applications made by doctors to the London Emergency Bed Service for admission of patients was 967, of whom 90% were admitted.

COMING EVENTS

G.P. Refresher Course.—A refresher course will be held at the West Middlesex Hospital from April 16 to July 2. Lectures will be given every Wednesday at 2 p.m., and full details may be obtained from Dr. Marjory Warren, West Middlesex Hospital (Hounslow 2311).

Medical Illustration.—An exhibition of photography and art in medicine will be held from June 13 to 28, in the Old Library, British Medical Association House, Tavistock Square, London, W.C.1. The exhibition, which is designed to be fully representative of all aspects of medical illustration, is being jointly presented by the Medical Group of the Royal Photographic Society and the Medical Artists' Association of Great Britain, and is limited to entries by members of both bodies.

Sea and Air Port Health Authorities.—The annual general meeting of the Association of Sea and Air Port Health Authorities of the British Isles will be held at Rochester from June 11 to 13. Hotel accommodation is limited, and delegates are advised to book early. Full details may be obtained from the secretary of the association, Civic Centre, Southampton.

Hospital Administrators' Summer School.—The Institute of Hospital Administrators is holding its summer school at High Leigh, Hoddesdon, Hertfordshire, from July 3 to 10. The inclusive charge for members and registered students will be six guineas, for others seven guineas. Application should be made as soon as possible to the director of education, the Institute of Hospital Administrators, 75, Portland Place, London, W.1.

Correction

The meeting of the Osler Club on April 18 (*Journal*, March 29, p. 722) will take place at 7 p.m. and not 7.45 p.m. as stated.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday, April 7

AUXILIARY ROYAL ARMY MEDICAL CORPS FUNDS, 11, Chandos Street, London, W.—5 p.m., annual general meeting.

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, London, S.E.—5.30 p.m., lecture demonstration for post-graduates by Dr. K. Cameron.

Tuesday, April 8

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—3.45 p.m., "*Aortic Arch Anomalies*," Erasmus Wilson Demonstration by Mr. A. T. Andreasen.

ROYAL EYE HOSPITAL, St. George's Circus, Southwark, London, S.E.—5 p.m., "*Genetics in Ophthalmology*," by Mr. Arnold Sorsby.

Wednesday, April 9

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, London, W.C.—5 p.m., "*Agoraphobic Giddiness*," Guest Lecture by Professor L. Ibor (Madrid).

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—3.45 p.m., "*Restricted Pulmonic Flow*," Erasmus Wilson Demonstration by Mr. A. T. Andreasen.

ROYAL EYE HOSPITAL, St. George's Circus, Southwark, London, S.E.—5.30 p.m., "*Visual Fields*," by Mr. Howard Reed.

SOCIETY OF CHEMICAL INDUSTRY: FOOD GROUP.—At Chemical Society, Burlington House, Piccadilly, London, W., 6.30 p.m., 21st annual general meeting of Food Group, "*Health and the Diet in the Western World*," by Professor Ancel B. Keys (University of Minnesota).

Thursday, April 10

EDINBURGH UNIVERSITY, University New Buildings, Teviot Place.—At Anatomy Theatre, 5 p.m., "*Poliomyelitis*," Honyman Gillespie Lecture by Dr. W. R. Russell.

INSTITUTE OF PSYCHIATRY, Maudsley Hospital, Denmark Hill, London, S.E.—3 p.m., "*Adrenal Cortex Function in Normal and Schizophrenic Men*," public lecture by Dr. Hudson Hoagland.

ST. ANDREWS UNIVERSITY.—At Materia Medica Department, Medical School, Small's Wynd, Dundee, 5 p.m., "*Growth and its Disorders*," by Professor R. W. B. Ellis.

APPOINTMENTS

DAVIES, JOHN DAVID, M.B., B.Ch., F.R.C.S.Ed., Consultant Surgeon, Glantawe Hospital Management Committee, Welsh Regional Hospital Board.

FERGUSON, H., M.B., Ch.B., D.M.R.D., Senior Registrar in Radiology to North Gloucestershire Clinical Area, South-Western Regional Hospital Board.

PAINE, DOUGLAS H. D., M.B., B.S., D.P.M., Consultant Psychiatrist and Medical Superintendent to St. Margaret's Hospital, Great Barr Park, Birmingham (Birmingham Regional Hospital Board).

SHERBURN, V. E., M.B., Ch.B., Medical Director, South Yorkshire Mass Radiography Unit, Sheffield Regional Hospital Board.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Langmaid.—On March 23, 1952, at 174, Lake Road East, Cardiff, to Olga, wife of Charles Langmaid, F.R.C.S., a daughter.

Morrison.—On March 13, 1952, at County Hospital, Bangor, North Wales, to Dr. Anne R. Morrison, wife of Dr. J. B. Morrison, Abergele, a daughter.

DEATHS

Allan.—On March 27, 1952, at West View, Elgin, Ebenezer Allan, F.R.C.S.Ed.

Coope.—On March 25, 1952, at his home, 19, Cambridge Road, Southport, Lancs, Thomas Edwin Coope, M.B., Ch.B., formerly of South Shore, Blackpool, aged 56.

Crossman.—On March 22, 1952, at his home, White's Hill, Hambrook, near Bristol, Francis Ward Crossman, O.B.E., M.B., B.S., J.P., aged 80.

Griffith.—On March 26, 1952, in Ireland, Patrick Gill Griffith, M.B., B.Ch., D.P.H., of Three Gable, Walton-on-Thames, aged 87.

Macleod.—On March 24, 1952, at the Queen Elizabeth Hospital, Birmingham, Nicol Campbell Macleod, O.B.E., M.B., Ch.B., D.P.H., of 13, Brueton Avenue, Solihull, Warwicks.

Murray.—On March 24, 1952, at Embassy Hotel, 150, Bayswater Road, London, W., William Alfred Murray, O.B.E., M.B., C.M., D.T.M., aged 88.

Overend.—On March 22, 1952, at the Buchanan Hospital, St. Leonards-on-Sea, Sussex, Thomas Dallas Overend, M.R.C.S., L.R.C.P., D.M.R.E., aged 57.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Appendicitis in Infancy

Q.—*What is the clinical picture of appendicitis in infancy? How frequent is it?*

A.—The picture of appendicitis in infancy differs in certain ways from that occurring in the adult. In the latter case there is a classical picture of pain first in the upper abdomen, later descending into the lower abdomen on the right side; constipation is marked, the tongue is coated and breath offensive, and tenderness in the appendix region is always present. In the infant diarrhoea is more common than constipation, and the tongue is not coated nor the breath offensive as a rule. Locally, the appendix tenderness is often hard to elicit, for obvious reasons. Vomiting is a marked feature, the temperature is very high, and the abdomen is distended and tender. The pain is constant, as shown by incessant crying, not being intermittent as in other abdominal conditions in infancy. The urine, although high coloured, is clear of sediment; it is important to test it, as pyelitis mimics the disease. In females pneumococcal peritonitis is very similar and should be thought of.

Diagnosis is difficult and tragedies occur, but fortunately the disease is very rare in infants. Rectal examination is helpful, and might even be done under anaesthesia in a difficult case.

Stellate Ganglion Block

Q.—*Professor René Leriche advocates stellate ganglion block in cerebral embolism and thrombosis (see "British Medical Journal," 1952, 1, 233). Please give briefly the indications for this procedure, indicating whether the injections should be homolateral, contralateral, or bilateral, how often they should be repeated, and a reference to a good description of the technique.*

A.—The stellate ganglion in the dog is formed by fusion of the upper four thoracic ganglia and is a regular anatomical feature. In man it is usual for the inferior cervical and first thoracic ganglia to be fused into a dumbbell-shaped structure which is commonly called the stellate ganglion.

The technique of stellate ganglion injection cannot be described in detail here, but the three chief methods in common use are described in the literature (Mackey *et al.*, 1938; Gilbert *et al.*, 1948; Naffziger *et al.*, 1950). In short, a spinal puncture needle is inserted by an anterior, a posterior, or a lateral approach until its point lies in contact with the junction of the anterior surface of the transverse process and body of the last cervical or first thoracic vertebra, the actual site varying with the technique. From 3 to 20 ml. of 1% procaine solution may be injected, and a successful block is followed by the appearance of Horner's syndrome in a few minutes.

Although Leriche is a keen advocate of this method of therapy, considerable difference of opinion is expressed by some authorities and accurate assessment of the published results is very difficult. Unless striking improvement follows within a few minutes of the injection it is difficult to ascribe it to the treatment. Judged by this strict criterion, many of the alleged successes must be dismissed as due to the spontaneous improvement which may occur in the absence of any specific therapy. Scientific assessment of the results is difficult, and, although the electroencephalographic tracing often improves together with the clinical condition, studies of the cerebral blood flow have been somewhat inconclusive.

Most authorities advocate block on the side of the cerebral thrombosis; some believe that contralateral injection is more effective, but the available evidence is most confusing. Animal experiments suggest the possible value of bilateral injection, but this, too, has not been definitely established in man.

One problem in treatment can be the difficulty of differentiating cerebral thrombosis and cerebral haemorrhage, stellate ganglion block being contraindicated in the latter condition. Generally speaking, this is not an operation for the general practitioner, although with suitable training and practice he could attain the requisite skill. In the ordinary way such cases should be treated in hospital. The frequency with which the injections should be repeated is a matter of opinion, some giving only one or two, while others repeat them once or twice daily. Subsequent injections produce noticeably less response.

REFERENCES

Gilbert, N. C., and de Takats, G. (1948). *J. Amer. med. Ass.*, 136, 659.
Mackey, W. A., and Scott, L. D. W. (1938). *British Medical Journal*, 2, 1.
Naffziger, H. C., and Adams, J. E. (1950). *Arch. Surg., Chicago*, 61, 286.

Sebaceous Cysts of the Scalp

Q.—*How can sebaceous cysts of the scalp be removed without scar? Can they be evacuated by syringe and wide needle, filled with spirit, evacuated again, and bandaged with a firm pad?*

A.—Excision of sebaceous cysts of the scalp with careful suture leaves a negligible scar. Sutures should not be left in more than three days. Aspiration is usually difficult or impossible, and the injection of spirit or a sclerosing liquid may be attended by unpleasant reactions. In addition, scarring after this procedure would make any subsequent operation more difficult. In those rare cases where the whole or a large part of the scalp is involved, removal of the affected scalp, replacement by a free skin graft, and provision of a wig may be the only answer to the problem.

Otitis Media, Flying, and Bathing

Q.—*Should patients with a long history of recurrent otitis media and symptoms suggestive of chronic eustachian catarrh be allowed (a) to travel by air or (b) to swim or dive?*

A.—(*a*) There would be no risk in a pressurized plane. In an ordinary plane damage would be expected only if the plane had to climb very high or make an unusually rapid descent.

(*b*) Diving should be forbidden. Swimming may be allowed, provided the water is clean and not over-chlorinated and that the swimmer does not get too chilled. Should, unfortunately, otitis media develop, it must be treated promptly.

Colour Vision of Schoolchildren

Q.—*What is the best way of testing the colour vision of schoolchildren, particularly the "school-leavers"? I am at present using the Ishihara test.*

A.—The testing of the colour vision in schoolchildren presents as a rule no special difficulty. The Ishihara test is excellent, but for "school-leavers" a more searching test may be provided by some form of lantern, such as the Edridge Green, the R.A.F., or the Canada Naval Department lantern.

When it is required to examine very small children who do not know their numbers the sinusoidal tests at the end of Ishihara's book may be used, care being taken to cover the surface with new cellophane so as to avoid finger-marks. Another good test for small children is the bead test. This may consist of six red, six green, six white, and, if desired, six yellow or orange beads. The child is given a bead and is asked to select the five remaining beads of the same hue. An interesting variant of the bead test, to be used only in

the case of children who ought to know the names of colours, consists of six beads only, two red, two green, and two white. The examiner places two beads on a dark surface in front of the candidate, and asks for the names of the colours. With these six beads, nine different combinations are possible—namely, both red, both green, both white; right red and left white; vice versa; right green and left white; vice versa; right red and left green; vice versa. This is the basic principle of the Canadian lantern test referred to above.

Facial Hair in Women

Q.—*Where can I find information on how to remove hair from the face without stimulating its growth?*

A.—On p. 27 of the book "*Any Questions?*" The book can be obtained for 7s. 6d. (postage 6d.) from the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

Perversion of Appetite in Infants

Q.—*What are the causes of perversion of the appetite in infants? How should such cases be investigated and treated?*

A.—The term "perversion of appetite" should be reserved for those infants in whom a compulsive oral craving for bizarre substances has superseded a normal response to ordinary activities, of which eating food is only one. Bizarre preferences, if occasional or in addition to a normal reaction to food, no matter how unappetizing or odd they may appear to the adult, should not be unnecessarily or forcibly resisted, for their purpose is to allay infantile dissatisfaction.

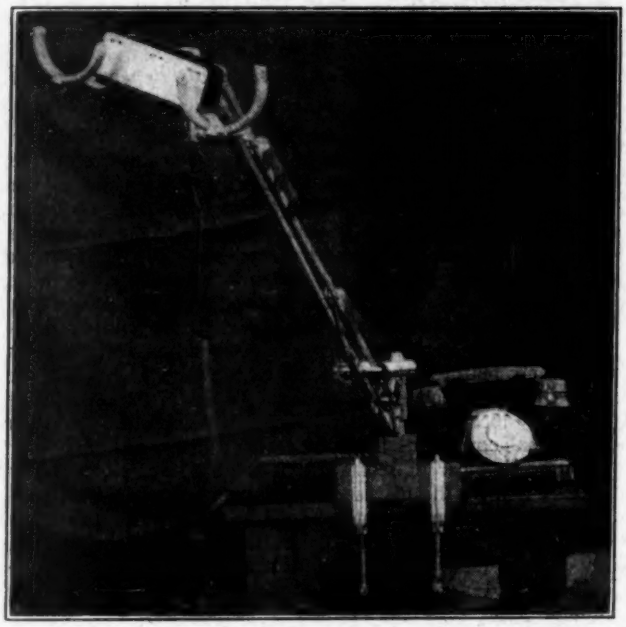
The establishment of an oral perversion, as strictly defined, always points to an emotional disturbance. The only incurable type is that due to mental deficiency, and this can be diagnosed from the earliest ages by the use of easily applied intelligence tests devised both by Buhler and by Gesell. In all other cases it is important to decide whether the infant's desire for oral gratification is *by nature* more intense than its actual nutritional needs warrant, or because of a sense of deprivation due to a harsh or rejecting attitude on the part of the mother. If the former, then all that is required is a more suitable form of oral "comforter" than, for example, its clothes or its cot rail. When the infant realizes that it can have as much oral satisfaction as it wants, the demand gradually lessens in intensity and simply disappears to make room for other and more appropriate activities.

If, however, the infant also has a harsh or rejecting mother, then the oral demand not only becomes intensified but serves, secondarily, as the vehicle for expressing the infant's emotional hunger. Thus a vicious circle is set up which imposes its oral pattern on later phases and situations. Because of the maternal attitude, feeding and habit training are likely to be unsympathetically handled. Normal infantile ignorance, combined in these instances with depressive reactions, then produce confusion in the child's mind between solid substances which *must* be taken into its mouth and faeces which *must* be parted with and then rejected by the mother. As a result any suggestive substances may then take on and retain a faecal significance to the infant, and food may therefore be rejected. Alternatively, the infant may eat substances either like or unlike faeces, such as coal or paper. Severe cases in which actual solitariness also plays a part may resort to eating their faeces (described by Spitz).

Treatment consists in trying to alter the mother's or nursing staff's attitude to and handling of the infant, by inducing, if not love and sympathy, at least pity and adequate toleration of its person and its physical processes. It is often a matter of surprise how much more quickly these so-called "perversions" yield to kindliness rather than to fear.

NOTES AND COMMENTS

Gadgets for the Armless.—Another gadget for holding a telephone receiver ("Any Questions?" January 26, p. 230) is described below by Dr. L. T. POOLE (Jedburgh). It consists of the lower section of a three-piece Anglepoise lamp inserted into a wooden block which is clamped to a small table or office stool (see Figure). The receiver is supported in a fitting made



of aluminium alloy and consists essentially of a U-shaped trough lined with leather and two clips covered with plastic tubing. This fitting has two friction joints which attach it to the Anglepoise so that the receiver can be adjusted both vertically and horizontally to allow the earpiece and the mouthpiece to lie in correct position no matter at what angle the head is held. These movements are additional to those of rotation and of raising and lowering of the limb of the Anglepoise. Balancing the Anglepoise is achieved by weights, using the springs as supplied with the lamp. A leather thong to pull the apparatus into position and a weighted rod to take the place of the receiver on the telephone complete the outfit. The points about this apparatus are: (*a*) ease of manipulation—it swings into position and can be swung over the shoulder out of the way and clear of the desk; (*b*) it is quite stable, provided the vertical axis of the Anglepoise is at right-angles to the ear; (*c*) the hand is free to write and lengthy conversations can be carried on without fatigue; (*d*) the design is neat and unobtrusive and the apparatus can be used in any room with a telephone.

Certain regulations have to be observed with regard to the telephone, but no objections are likely to come from the Post Office, since there is no real interference with the instrument. The disabled person for whom this gadget has been made finds it invaluable, but it could also be quite useful to a person with full use of both arms.

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